

Ethiopian-owned firms in the floriculture global value chain

With what capabilities?

Melese, Ayelech Tiruwha

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Ethiopian-owned firms
in the floriculture
global value chain:
With what capabilities?

Ayelech Tiruwha Melese



CAE Working Paper 2017:2

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Department of Social Sciences and Business, Roskilde University

Universitetsvej 1, 4000 Roskilde, Denmark

www.ruc.dk/cae

Email: cae@ruc.dk

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ABSTRACT

The Ethiopian floriculture industry is relatively young and yet has rapidly expanded to emerge as the fifth largest flower exporter worldwide. The success was driven by local investment combined with foreign direct investment, and actively supported by targeted industrial policy from the government as well as development cooperation, particularly from the Dutch government. Although foreign firms dominate the industry now, local firms have participated since its inception and were involved in pioneering the sector. This paper measures and analyses the technological capabilities, competitiveness and export trajectories of Ethiopian-owned firms engaged in cut-flower production for export. It constructs a technological capability matrix that describes the specific capabilities required to enter and operate in different parts of the floriculture global value chain, adjusted for the specificities of the Ethiopian industry, and uses this matrix to design a local firm survey to assess firms' capabilities across four categories: product and production process, input integration, linkages and end-market. The survey was carried out with almost all local firms. The aggregate technological capability scores show that all firms have developed their capabilities, as they scored medium and above in most categories. However, none of the firms except one showed a uniform score across the four capability categories, which means that firms did not build all categories of capabilities to the same level. The paper also analyses firms' technological capabilities compared to measures of competitiveness, which underscores the complexity and dynamism of the relationship between capabilities and competitiveness. The findings show that firms can increase their competitiveness (measured in terms of unit price) by selectively deepening capabilities that are important to meeting the requirements of the targeted market channel. In sum, the different export trajectories among firms can explain some of the discrepancy between capabilities and competitiveness.

AUTHOR

Ayelech Tiruwha Melese

PhD candidate, Doctoral School of Social Sciences and Business, Roskilde University, Denmark.

ayelech@ruc.dk

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AFRICAP examines industrialization in African countries in the context of increasingly globalized production networks coordinated through transnational inter-firm linkages. African-owned firms often struggle to enter new export sectors in manufacturing and agro-processing, to remain competitive within them, and to capture greater value. AFRICAP focuses on firm-level capability building and combines this firm level analysis with an understanding of global value chains and national institutional factors. The project analyzes various channels that facilitate learning among firms: industrial policies, foreign direct investment linkages, and firm-specific networks and experience.

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Ethiopian-owned firms in the floriculture global value chain: With what capabilities?

Introduction

The Ethiopian floriculture industry was pioneered in the 1990s by local entrepreneurs and rapidly emerged as one of the largest floriculture industry in the world. The success was driven by local investment combined with foreign direct investment, and actively supported by targeted industrial policy from the government as well as development cooperation, particularly from the Dutch government. The floriculture industry is an important source of foreign exchange and employment in Ethiopia, as it has generated around USD 162 million foreign exchange per annum between 2006/07 and 2014/15 and employed about 50,000 people. The Ethiopian floriculture industry includes roses, summer flowers and cuttings, covering over 1,600 hectares of land under modern greenhouses, but rose production is dominant, accounting for over 80% of the total cultivation.¹ The main export destination is the Netherlands, followed by Saudi Arabia, Norway and the United Arab Emirates.

Both local and foreign firms have been operating in the Ethiopian floriculture industry, but over time foreign firms assumed greater dominance. In 2016, out of a total of 82 firms, 15 had full local ownership and one was a joint-venture between local and foreign investors. We initially included the joint venture in the definition of locally owned firms, assuming that the local investors were active partners. Of these 16 local firms, two were collapsing. The firms still actively operating were described by an industry expert as ‘gold tested by fire’, due to their resilience after shocks to the industry from the global financial crisis that began around 2008.

This paper is part of the AfriCap research project, which aims to advance our understanding of how and why African-owned firms build the technological capabilities required to enter and remain competitive within new export sectors such as floriculture. It asks why local entrepreneurs invest in these new economic activities and how they learn to become competitive in globalized industries. In particular, the project is interested in the factors that facilitate learning among local firms, especially in the risky contexts of African countries in which there are many constraints on productivity that have to be addressed not only at the firm level but also at the industry and national levels. This situation raises the following questions: why do local investors take this risk, what factors explain whether they succeed in becoming competitive, and

¹ Cut-flower production for export is concentrated within a 200 kilometer radius around Addis Ababa, the capital, where Bole international airport is located.

what factors explain variation in the overall capabilities and competitiveness among local firms. As the first step in this research, we must know what kind of capabilities local firms actually have.

In a previous working paper, the AfriCap research team presented our conceptualization of what it means to build capabilities within global value chains and developed a technological capability matrix that describes the specific capabilities required to enter and operate in different parts of the floriculture global value chain (Staritz et al. 2017). The matrix, which is presented again in this paper, was constructed based on a background study of the floriculture global value chain, as well as background research on the Ethiopian floriculture industry and a mapping of the local firms and their capabilities based on what was already known from secondary literature and previous fieldwork on the industry.² A local firm survey questionnaire was developed based on the matrix, and the survey was carried out with 13 of the 15 fully Ethiopian-owned firms exporting cut-flowers in June 2016. This paper presents the findings from the survey of Ethiopian-owned firms engaged in cut-flower production for export. It measures and analyzes the technological capabilities, competitiveness and export trajectories of these firms.

The first part of the paper presents a summary of the Ethiopian floriculture industry, focusing on the emergence and evolution of the industry as a whole. It concludes by presenting the locally owned firms still operating in the industry as of 2016 and identifying characteristics of their owners, based on fieldwork carried out in preparation for the local firm survey. The second part of the paper analyzes the results of the local firm survey, scoring firms on indicators grouped within four categories of capabilities: product and production process, input integration, linkages and end-market. Each firm is given a sum score for each capability category as well as an aggregate technological capability score, on a scale of low, medium and high.

Local firms in the Ethiopian floriculture industry have aggregate capability scores ranging from high, medium-high, medium, to low-medium. The firm survey results, which also included questions on initial experience and investment, show that most of the local firms considerably deepened their technological capabilities since they started operations. The capability scoring also shows significant variation in scores across the four categories of capabilities. This variation indicates that local firms did not build all types of capabilities to the same level. Instead, they appear to invest in building capabilities selectively.

² The author conducted fieldwork on the Ethiopian floriculture industry in 2009, interviewing key informants to assess the overall performance of the sector in the aftermath of the financial crisis. Fieldwork was also undertaken in 2014 and 2015 for a different project that included interviewing some local and foreign firms. Although that research focused on labor, and included a labor survey and life story records of flower farm workers, it touched upon general features of the firms and involved in-depth discussions with key managers, repeated visits to farms and farm observations. In writing this paper, the author sometimes draws upon on this previous research.

Firms' technological capabilities are also compared to measures of competitiveness in order to assess whether there are clear correlations between building technological capabilities and export performance in terms of export value, export volume and unit price. The comparison of firms' capability scores to several different types of competitiveness measures highlights the complexity and dynamism of the relationship between capabilities and competitiveness, as firms experienced not only rapid growth but also stagnant periods and even setbacks. The complexity of the relationship between capabilities and competitiveness, as well as the potential influence on firms' investment in learning, was further studied by examining price. Firms that specialized in the Dutch auction market channel and developed the specific capabilities required to perform well in this market—consistency in quality, quantity and presence at the auction—obtained higher unit prices in the auction than local firms which operated in multiple market channels, and thus had trouble achieving as high a level of consistency in the Dutch auction. This finding indicates that firms can increase their competitiveness (measured in term of unit price) by selectively deepening capabilities that are important to meeting the requirements of the targeted market channel.

Based on this analysis, local firms are categorized into three groups based on their export trajectories: firms that largely sell via Dutch auction but try to diversify to all kinds of end-markets (trajectory 1); firms that sell via direct sales only (trajectory 2); and firms that sell via Dutch auction only (trajectory 3). There is still a divergence in firms' capability and competitiveness measures within the same trajectory, which might be a result of the idiosyncratic learning processes of each firm. Half of the six firms in trajectory 1 exhibit relatively stronger performances in both capabilities and competitiveness measures, while the other half have mixed results. Firms in this trajectory face the challenge of meeting different specifications of several end-markets in a consistent manner and the process might sometimes cause mismatches in their capabilities and competitiveness. Although the two firms in trajectory 2 appear to face similar challenges, they were better able to overcome these challenges using their personal networks in marketing and because they operated mostly under contract arrangements, in contrast to firms in trajectory 1 which operated in the Dutch auction (which is not a contract arrangement). In terms of the aggregate capability score, one of the firms scored medium-high, while the other showed a mixed score. The three firms in Trajectory 3 appear to be more consistent in terms of scoring relatively similar results in both capability and competitiveness. One firm scored medium-high in capabilities, while the other two both scored medium.

Part I: Evolution of the Ethiopian Floriculture Industry

This part of the paper discusses the evolution of the Ethiopian floriculture industry in the context of the floriculture global value chain. Although the origin of the Ethiopian industry is traced back to state-owned firms that operated in the 1980s, the current form of the industry is directly related to two local entrepreneurs who pioneered the private-owned flower export business in the 1990s. Despite the considerable effort of these two firms, the industry failed to succeed initially due to the lack of appropriate infrastructure and government support as well as the entrepreneurs' limited knowledge in a highly competitive global market. Thanks to the creation of sector-specific institutions, active industrial policy and official development cooperation, those bottlenecks were largely removed and entry barriers were considerably reduced, which led to rapid growth in the sector. Since 2004/5, the industry experienced a large inflow of local and foreign investment and an expansion of sector-specific national capabilities. However, the global financial crisis of 2008 negatively impacted the industry and crowded out large numbers of firms, especially locally owned ones. As a result, foreign firms have come to dominate the industry, and only a small number of domestic firms remain in operation. Despite the stiff competition in the floriculture global value chain, in 2015, the Ethiopian industry appeared as the fifth largest exporter of flowers worldwide.

The inception and development

The beginning of floriculture production for export can be traced back to the 1980s. The communist government (1975-1991), commonly referred as the *derg*, established two state-owned horticulture firms with their own marketing and distribution centers (Etfruit³) based in domestic and foreign markets (World Bank 2004). The state-owned firms produced summer flowers on a small scale, next to their main products, which were fruits and vegetables. Although the flower production of these firms was short lived, the knowledge and the market network provided a foundation for the modern floriculture development in the country.

The contemporary floriculture industry of Ethiopia was built more directly upon the experiences of two locally owned private firms, Meskel Flower PLC and Ethio-flora PLC, which were established in the early 1990s near Lake Ziway, 160km south of Addis Ababa.

³ The two state-owned firms were called Upper Awash Agro Industry Enterprise (UAAIE) and Horticulture Development Enterprise (HDE). Although growing flowers on the state-owned firms began under the *derg* regime, the establishment of the firms (at least one of them) dates back to the 1970s, during the reign of Haile Selassie I (1930-1974), and it was founded as a joint venture (local and foreign). Under the *derg* regime, both firms and Etfruit (the marketing and distribution center) were state-owned. For some time all the three firms stayed public firms under the incumbent government, but substantial parts of the land they held was leased for floriculture in Ziway. In 2013, UAAIE was privatized and sold to MIDROC, the diversified business group owned by Mohammed Hussein Ali Al-'Amoudi. Etfruit and HDE still exist, but their ownership structure is not clear; they appear to be fully or partially privatized.

Meskel flower PLC was founded in 1992 by a former pilot who was educated in the USA and had a dream to set up his own business in Ethiopia. He made a considerable search effort in realizing his dream, including visiting commercial farms in the USA and the Netherlands, looking for international support from the World Bank and studying a detailed soil map of Ethiopia in order to find the appropriate location in terms of climate, soil and water (UNCTAD 2002). An UNCTAD report on investment and innovation policy in Ethiopia identified Meskel Flower PLC as a successful flower exporting firm that could have an important demonstration effect in attracting foreign direct investment and local investors to the sector if the necessary institutional support and appropriate physical infrastructure that were missing at that time could be provided. These two locally owned private firms made a substantial effort in a difficult business environment, but they lacked institutional support and appropriate infrastructure and they faced tough competition in the European market from highly experienced Kenyan and Dutch firms. As a result, Ethio-flora was forced to shift into fruit and vegetable production for export. These were less technologically intensive products in which the firm benefited more directly from the knowledge and network created by the state-owned firms such as Etfruit, through which Ethio-flora exported its products (World Bank 2004). Meskel Flower PLC reported that the tough competition pushed the firm to learn more about the market side of the business, and it eventually found out the potential of Germany's market for higher value products such as roses (UNCTAD 2002). As a result, Meskel Flower shifted into rose production, establishing the first rose growing firm in 1999. Unfortunately, it ceased operations in 2001 due to the arrest of its owner.⁴

The effort of Ethiopian-owned private firms to enter the floriculture global value chain in the 1990s partly coincided with changing dynamics at the global level. Traditionally, cut-flower production and consumption were concentrated in the so-called Global North, and Europe was the largest market. Between the 1980s and 1990s, the Netherlands became an international flower hub with the biggest flower auction houses (Labaste 2005). The Netherlands was the main site of production, import and re-export of flowers. However, several developing countries such as Kenya, Colombia, Ecuador and then Ethiopia emerged as important countries producing and exporting cut-flowers.⁵ As a result, the Dutch auction, which was the dominant market channel in the floriculture global value chain, took several measures to protect its position. One of the central challenges for the Dutch auction was to adjust to '...the remapping of the world's production of and market for cut-flowers' in the 1990s (Patel-Campillo 2011:91). One of the

⁴ The owner of Meskel flower (Eskinder Yoseph) was jailed in 2001-2 on an alleged corruption charge, which likely was politically motivated.

⁵ The history and evolution of the floriculture global value chain, and contemporary dynamics of the floriculture GVC, are analyzed in detail in a forthcoming working paper.

adjustment measures taken to protect Dutch growers included banning foreign products from the auction market in 1994. This ban pushed foreign firms⁶ to establish their own electronic auction system, the Tele Flower Auction, which allowed them to bypass the Dutch auction. This event brought developing country producers and European buyers closer, encouraging direct sourcing, in particular between Kenyan and UK firms (Patel-Capellio 2011; Taylor 2011).

Although the ban at the Dutch auction was reversed in the late 1990s, the adjustment process took a long time, which probably forced newcomers, like the Ethiopian pioneers and early entrants, to search for a new market or to shift to another sector. Moreover, at the time of the Ethiopian firms' entry into the floriculture global value chain, the export market was becoming more competitive as supply from developing countries increased and even outstripped demand. Concomitant with the increasing supply, however, was end-market specialization of supplier countries based on geographical proximity, which somewhat reduced competitive pressures. The major producers of Latin American countries such as Colombia and Ecuador continued catering predominantly to the US market, and Sub-Saharan African countries, such as Ethiopia, Kenya, and Uganda, mainly exported to European countries, where the largest consumers and traders resided (Rikken 2010).

Despite their failure to succeed in the global floriculture industry, the effort of the two pioneer firms, Meskel Flower and Ethio-flora, had a demonstration effect. The experience of these pioneer firms informed the decision of Golden Rose Agro PLC to enter the sector in 1999, which was also the first foreign direct investment in the industry (Gebreeyesus and Iizuka 2012).⁷ Although Golden Rose had no prior experience in floriculture, it had high investment capabilities and a willingness to take risks. It became the first firm to adopt modern technologies, such as a steel-based greenhouse, in the Ethiopian floriculture sector. It also demonstrated the potential of the country to grow high-quality roses as well as the importance of pre-investment decisions for capitalizing on that potential: for example, by choosing an appropriate location and associated technologies (Ibid).

Golden Rose began selling via the Dutch auction in 2001, but declining prices and disproportional service costs forced the firm to search for a new market, just like the pioneer local firms had to do. In a few months, it abandoned the auction channel and started direct sales

⁶ This includes Dutch farms that operated in developing countries such as Kenya as well.

⁷ According to Gebreeyesus and Iizuka (2012), Golden Rose was a subsidiary of RINA investment based in UK (Indian-British family), which had broader investment experience in African countries before its arrival to Ethiopia. Although its initial entry to Ethiopia was for another business bid, the failure of its original plan led to exploration of other opportunities in the country. The firm was convinced by its consultant to invest in rose production. The experience of the two Ethiopian pioneers provided input for the feasibility study of the firm. Golden Rose is no longer operating in the industry, but it made a huge investment in learning that benefited later firms.

to Germany. The success of Golden Rose attracted new entrants: three locally-owned firms (Enyi, SIET and Summit) and one joint venture firm (Ethio-Dream). The owners of Golden Rose were open to share their experience, materials and even its skilled workers with newcomer firms. As a result, the early entrants were able to learn production and marketing techniques, such as hiring expatriates, importing appropriate equipment, selecting the right varieties and sourcing them from international breeders and choosing market outlets (Gebereyesus and Iizuka 2012). The new firms appeared to imitate the market channel of Golden Rose, according to the World Bank (2004). By 2004, most of these new locally owned firms exported the largest share of their products to Germany via direct sales.

In 2002, the Ethiopian Horticulture Producer and Exporter Association (EHPEA) was formed by five fruit and vegetable producers (including Ethio-flora PLC) with the support of DFID, the UK development agency. Its members expanded to 20 by 2004, including the above-mentioned cut-flower firms. In the meantime, the Ethiopian government began implementing its Agriculture Development Led Industrialization (ADLI) development policy. Within the framework of ADLI, the government adopted an export-oriented development strategy that promoted selected sectors through various investment incentives. Floriculture was initially not among the selected sectors but was later included after the established flower firms lobbied for its selection using their Association. The leader of the Association (the owner of Ethio-flora PLC) played a crucial role in convincing the government to select floriculture as one of the priority export sectors, and hence he participated in designing the action plan for floriculture - the five-year development plan (Gebereyesus and Iizuka 2012).

In 2004, with the support of the government, some members of EHPEA (both local and foreign-owned firms) created a company called Ethio-Horti Share with the purpose of engaging in the collective importation of inputs and air cargo booking, in order to increase the supply of inputs for the sector and to lower costs of transport. Through this company, all growers were able to import inputs collectively and rent a cargo plane from Ethiopian airline (Melese and Helmsing 2010).⁸

Starting from 2003, the government provided financial and non-financial incentive packages to encourage expansion of the floriculture industry. The government also made land available in water abundant areas within proximity to Bole international airport. The land was provided to investors for long term lease at a very low price, around \$10 per square meter/annually compared to \$30-40 in Kenya (Oqubay 2015). The Development Bank of Ethiopia, a state-

⁸ However, in 2012, the national Ethiopian airlines cut out middlemen in cargo handling services, such as Ethio-Horti Share Company and others, and began providing the service in monopoly.

owned bank, provided soft loans that financed 70% of the cost of the project only pledging the project itself without additional collateral, at a very low-interest rate compared to neighboring countries such as Kenya, Tanzania and Uganda. Moreover, the incentives also included a five-year income tax holiday, loss rescheduling provisions and removal of tariffs and duties on capital goods. There was also a less discussed role played by the government such as easing regulations on the import of pesticides and fertilizers (Taylor 2011).

The incentives attracted a large number of domestic and foreign investors, who mainly came from the Netherlands, India and Israel. Between 2004 and 2005, the number of flower farms increased from 9 to 30, cultivating a total 150 hectares of land. In 2007, the number of firms reached 86 and the cultivated area grew more than fivefold, from 150 to 801.6 hectares (Melese and Helmsing 2010). The incentive package even attracted the largest rose farms in the world from Kenya to Ethiopia. The firm is called Sher Ethiopia; it began operation in 2006 on approximately 500 hectares of land in Ziway. The firm played an important role in the expansion of the industry through its turnkey project in which it built flower farms with all the requisite infrastructure in place and sold them on a hire-purchase basis. Investors could rent ‘ready to operate’ greenhouses with an opportunity to become an owner within eight to nine years. This model lowered the entry barriers for new firms. As a result, it attracted four local investors (including Meskel Flower, the pioneer⁹) and five Dutch investors. Moreover, Sher Ethiopia participated in multiple parts of the floriculture global value chain, which facilitated the further development of the sector in Ethiopia. For example, in 2006, it began importing and distributing inputs required by the growing industry, which also broke the monopoly held by the Ethio-Horti share company. In addition, Sher provided logistics, transport and agent services in the Netherlands, as well as locally via Flower Port Cargo PLC (Melese and Helmsing 2010; Taylor 2011).

⁹ Meskel Flower collapsed in 2001 following the arrest of the owner but upon his release in 2005 the owner established a new farm with the same name by renting a turnkey of Sher Ethiopia.

Table 1. Growth of Ethiopian flower industry

Year	No. of growers	Cultivated land (ha)	Export value in millions (USD)	Employment
2003/4	9		5	
2004/5	30	150	13	21,300
2005/06		345	23	
2006/07	86	802	64	
2007/8		922	112	25,816
2008/9		1,240	131	34,720
2009/10		1,306	170	36,568
2010/11		1,300	175	36,400
2011/12	80	1,299	198	40,387
2012/13			187	
2013/14	84	1,426	200	
2014/15	87	1,623	221	≈50,000

Source: Compiled by the author based on data from the National Bank of Ethiopia, Development Bank of Ethiopia, Ethiopian customs authority, Ethiopian horticulture development agency, Ethiopian horticulture producer and exporter association, and Oqubay (2015).

The boom that started around 2004/5 was not only due to the national government incentives but also to development cooperation, particularly by the Dutch government, which had a keen interest in the global floriculture industry and saw Ethiopia's potential as a new production site. As of 2003, the embassy of the Netherlands in Addis Ababa organized several trade missions and provided a subsidy under a program in emerging markets called PSOM (now known as the Dutch Good Growth Fund).¹⁰ This program provided a grant to Dutch investors that covered up to 60% of the project costs, with the condition that Dutch investors had to enter a joint-venture with a local partner from Ethiopia (Melese and Helmsing 2010).

However, the author's previous fieldwork in the industry indicates that the rush to invest in floriculture was not driven entirely by genuine interests, but also by a desire to take advantage of the cheap access to finance and land provided by the government's incentive package. Some investors diverted the funds for other purposes while holding a large tract of land unproductively, and other investors left the country with the money. Taylor (2011) reports similar kinds of misuse of finance in the industry.

¹⁰ For more information on the Dutch Good Growth Fund, see <http://english.dggf.nl/>.

The Dutch auction opened an import office in Ethiopia and expanded its client base quickly as the auction became the major market channel for Ethiopian flowers by 2006, capturing 67% of exported flowers. The Dutch auction plays the most influential role in the global value chain; however, as mentioned earlier, the direct sale channel has grown rapidly since the 1990s in European and other markets.

Reaching maturity and building capabilities

The inflow of more foreign direct investment created a critical mass in the Ethiopian industry. Local firms acquired the main production capabilities through *foreign consultants* and acquired some investment capabilities through *imitation*, but they did not actively cooperate with foreign firms in a way that could have allowed direct learning (Melese and Helmsing 2010:55). Therefore, they did not initially acquire enough capabilities to remain competitive in the industry and thus many struggled to survive when there was a crisis in the industry.

The rapid take-off of the floriculture industry in Ethiopia that began around 2005 demanded a matching learning pace in the country overall. Multiple actors such as private investors, the national government and international governments played a role in building the national and sectoral capabilities that were needed for the industry to develop. The Ethiopian Horticulture Producer and Exporters Association (EHPEA), whose members reached over 60, became a focal point for partnerships and to coordinate with state and non-state actors supporting the industry. Local and foreign firms were able to cooperate through the association for the purposes of collective action around non-core activities, such as importing inputs and lobbying government, even though they had not engaged in cooperation around core activities, such as sharing knowledge and collective marketing.

The government facilitated investment with a ‘one-stop shop’ service at the Ethiopian investment agency and set up the Ethiopian Horticulture Development Agency (EHDA) in 2008, creating a lead agency to take over the responsibilities of the horticulture development team that was operating under the Ministry of Trade and Industry. The EHDA worked closely with the cut-flower firms, through their industry association, to resolve problems related to resource and service mobilization such as electricity power, telecom, land and foreign exchange. In relation to air transportation, Ethiopian Airlines, which was granted a monopoly in the cargo transportation of flowers, expanded its logistics and transport capacity to meet the demand of the sector.

The industry association, apart from representing its members nationally and internationally, initiated and implemented projects (individually and/or jointly with others), lobbied

government, organized events (like global flower expo), provided market information, facilitated new entrants and provided training. One of the main achievements of EHPEA was the development of a sector-specific code of practice (CoP-Bronze, Silver and Gold levels) in collaboration with the Netherlands and the EHDA. This code of practice helped the industry to catch up with international standards, which acted as governance mechanisms in the global value chain. There are several certification schemes in the global floriculture sector geared towards addressing environmental and social concerns. The MPS-ABC and GLOBAL-GAP, which are business-to-business standards, are the most widely adopted in the global floriculture industry. In 2015, the Silver level of the Ethiopian code of practices was benchmarked to GLOBAL-GAP. The primary concern of these business-to-business standards is good agricultural practice and environmental protection. However, MPS later incorporated social issues, resulting in the MPS-SQ (socially qualified). The other international standards include consumer labels, such as Fair Flowers Fair plants, Flower Label Program, Fairtrade Labelling Organization, and Ethical trade initiatives. Most of these standards cover more (sometimes exclusively) social issues rather than business-to-business standards, while also addressing environmental concerns. In 2010, 28 firms in the Ethiopian industry adopted one or more of these international standards, but MPS was by far the most dominant (Gebreyesus 2014).

The Ethiopian floriculture industry continued receiving considerable support from international donors and development cooperation at different phases of its development, but the most prominent support came from the Dutch government and its support was broadly linked to building institutions that were core to the industry. For instance, the PSOM program supported firms to set up a logistics company for perishables and a laboratory for soil analysis. In addition, the Ethiopia-Netherlands Horticulture partnership, a public-private partnership, was created in 2006 to support the development of the industry through an extensive capacity building program that included the creation of the Ethiopian codes of practice (mentioned above), a phytosanitary unit, an integrated pest management system, and a decision support system for selecting new production areas.¹¹ In addition, the program supported the establishment of a training unit under EHPEA and sector specific trainings were carried out in collaboration with higher education institutions such as Jimma University, one of the oldest agriculture colleges in Ethiopia. As a result, the program played an important role in creating trained labour for the sector. Finally, based on demand from the industry association, the Center for the Promotion of

¹¹ Some of the results of the Ethiopia-Netherlands Horticulture partnership program are presented in a Dutch government evaluation report of 2009, available at <https://www.government.nl/documents/reports/2009/03/01/review-of-the-wssd-public-private-partnership-program-in-ethiopia>

Imports from Developing Countries (CBI)¹² organized trainings on specific topics targeting local firms as well as foreign firms with investors from developing countries such as local and Indian firms. CBI's training program was upgraded and started in 2009 to include a master level class given to firms that appeared committed to stay in the industry.

Surviving the tide and repositioning in the floriculture global value chain

The global financial crisis led to a considerable drop in demand and prices for cut-flowers, especially between 2007 and 2009, significantly affecting the global floriculture trade (Taylor 2011). Flowers are a luxury product, and thus they tend to be sensitive to changes in disposable income. Growth in global floriculture trade continued to be unstable after 2009 and the large drop in flower consumption had not fully recovered by 2016 (Rabobank 2016). In some end-markets, consumers switched to low-value products, such as short stem and small head size roses known as sweethearts, which benefited the unspecialized segment of the global market such as supermarkets and Do It Yourself stores (Ibid). Firms that produced intermediate and high-quality flowers for specialized segments such as florists were adversely affected by the global financial crisis.

Despite considerable development in their technological capabilities, many local firms were not able to withstand the global financial crisis. As a consequence, foreign firms became more dominant in the Ethiopia floriculture industry, as shown in Table 2 illustrating the trend in number and ownership of firms in the sector. Between the period 2007 to 2011, a large number of firms, especially the locally owned firms, collapsed or their management was taken over temporarily by the Ethiopian Development Bank (the lender). However, the Ethiopian Development Bank itself needed to learn, as it had limited knowledge about the floriculture sector, so it was not unusual to find some collapsed farms being guarded by the Bank's security personnel and waiting for a new buyer to come. Nevertheless, the Bank considered the industry's challenge with the global financial crisis; it revised loan repayments and provided a grace period to the firms. But the crisis did not stop the Ethiopian floriculture from growing in export value and volume, although it grew at a lower rate compared to the rate between 2005 and 2008 (see Table 1).

¹² CBI was established in 1971 and is part of the Dutch enterprise agency funded by the Dutch ministry of foreign affairs.

Table 2: Number of flower firms by ownership¹³

Ownership	Number of flower farms					
	2005/6	2006/7	2008	2012	2013	June 2016
Ethiopian	21	38	23	19	12	15
Joint	8	9	15	7	12	1
foreign	13	26	26	43	30	66
unknown	7	13	3		8	
total	49	86	67	69	62	82

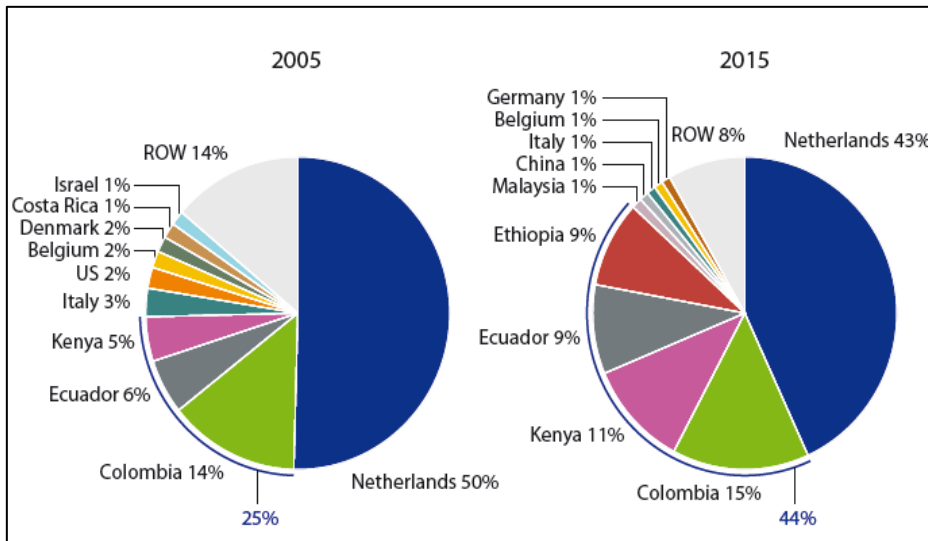
Source: Melese and Helmsing (2010); Gebreeyesus and Iizuka (2012); Oqubay (2015); EHPEA website: <http://www.ehpea.org>, last accessed December 2016.

During preliminary research in 2016, ahead of the local firm survey, I confirmed that there were a total of 82 flower firms operational in the country, of which 61 were rose growing firms, 15 summer flowers and the remaining 6 produced cuttings.¹⁴ Some of these firms produce other horticulture products for export, in addition to flowers, such as fruits, vegetables and herbs. According to EHDA, in 2015 the total cultivated land reached 1.623 hectares, and 66 firms exported 50.4 million kilograms of flowers and generated US\$ 221 million foreign exchange. This export value positions Ethiopia as the fifth biggest exporter, marginally trailing behind Ecuador (see Figure 1). According to Rabobank (2016), in the last decade, Ethiopia, Kenya, Colombia and Ecuador have taken global market share from the Netherlands, and in 2015 for the first time, the aggregate export share of these four countries (44%) surpassed the share of the Netherlands (43%).

¹³ The number of farms can be over or understated, and proper identification of ownership is a difficult task, as the available database from EHDA does not seem to be updated when changes occur in ownership. Moreover, sometimes a single firm might be reported with different names, such as by the owner's name as well as by the firm's name. Although considerable effort has been made to solve this problem through triangulation of different sources, one should not be surprised to find reports with slightly different total number of firms and ownership structures.

¹⁴ Cuttings include planting materials for cut-flowers such as roses and summer flowers. Cuttings are controlled by a handful of European multinational companies engaged in breeding and propagating. Some of these companies set up fully owned and controlled subsidiaries in developing countries or set up joint ventures with 'captive' partners (Evers et al. 2014). Engaging in the production of cuttings requires higher technological capabilities than cut-flowers, as it needs dedicated research and development, and higher knowledge, as well as licences to propagate.

Figure 1: Largest cut-flower export countries of the world in 2005 and 2015



Source: Rabobank (2016).

Note: The Netherlands share typically includes re-exports.

The Netherlands remained the main destination of Ethiopian flowers. In 2015, around 84% of Ethiopian flower exports was to the Netherlands, followed by Saudi Arabia (5%), Norway (2.3%), United Arab Emirates (1.59%) and Germany (1.32%). Similarly, the Dutch auction was the dominant export channel for Ethiopian flowers, but the direct sales channel was increasing. Although the two market channels are often discussed as separate and independent from each other, this seems to be slowly changing in the contemporary global value chain of floriculture, thanks to online trading (e-trading). As explained below, the emergence of online trading is blurring the line between the auction and direct sales channels. One can find the two channels playing complementary roles and cooperating in areas where one expects them to be competing. The auction appears to be acknowledging the inevitable change and hence leading as well as adjusting for the newly emerging e-trading system. Such adjustments to change or innovation are not new to the Dutch auction. For example, in response to the rise of direct sales channels, the auction began a system that can facilitate direct buying and selling, the so-called auction-direct or Floraholland-Connect, with an effective logistics system. Moreover, as the e-traders explained, by introducing an electronic remote buying system (KOA) in the 1990s, the auction laid the foundation for online trading.

Similarly, one of the most important market channels for some local firms in the Ethiopian floriculture industry cannot be described as auction or direct sales, but rather it is a little bit of both. The buyer's office is physically located in one of FloraHolland's auction houses, and it

plays various roles in different parts of the global value chain as a consolidator, importer, exporter and so on. Its newest business is e-trading with supplier firms from developing countries, mainly from Ethiopia and Kenya. The buyer (e-trader, hereafter) claims to have a strong capability to predict a daily auction price so that it can offer in advance a slightly higher price to suppliers (for instance, Ethiopian-owned firms) that are connected with it via its online platform. The supplier decides to permit the e-trader to start selling part of its daily shipment via its web shop before it is even shipped to Europe. If the e-trader was unable to sell the entire agreed amount by the time the shipment arrives, the unsold flowers go directly to the auction, and the e-trader pays for the sold amount via the auction payment system. Although the e-trader is directly competing with the auction, it is doing so with the cooperation of the auction by sharing one of its most important competitive advantage, a fast and guaranteed payment system, which is a highly valued service in the eyes of supplier firms.

Notwithstanding its growing importance, in this study, the e-trading marketing channel is treated the same as the auction channel because the two channels have similar requirements and the e-trader is capitalizing on the auction system to shift to online direct sales. However, according to interviews with the e-traders, this might change soon. Similar views have circulated on some prominent online magazines that focus on the industry, questioning the relevance of the auction in the context of online trading and introducing a new business (a guaranteed payment system) that would enable buyers and suppliers to move forward with e-trading.¹⁵

Similarly, the direct sales channel in the floriculture global value chain is predominantly conceptualized from the perspective of supermarkets in Western countries (Riisgaard and Hammer 2008; Gebreeyesus and Sonobe 2009; Taylor 2011; Evers et al. 2014). However, there are types of buyers other than supermarkets that are growing in importance for smaller supplier firms that largely produce for specialized market segments, and also new end-markets. The contemporary floriculture global value chain is characterized increasingly by the emergence of new demand in the global South and alternative outlets for producers in developing countries. For instance, Saudi Arabia is the second largest destination of Ethiopian flowers. In addition, traditional wholesalers are increasingly leaving the auction to engage in the direct sales channel. These wholesalers are typically the supplier of specialized retailers such as florists, gardening centers, street markets and web-shops, which are dominant flower outlets in Europe with a market share of approximately 66% (CBI 2015).

¹⁵ See, <http://www.floraldaily.com/article/7543/NL-Trading-can-be-done-online,-why-still-auction>, written by René Fransen, Ai2. Publication date: 11/18/2016

Locally owned firms in Ethiopia's floriculture export industry

When I carried out the local firm survey in June 2016, there were 15 Ethiopian-owned firms and one joint venture between Ethiopian and Dutch partners. The joint venture was established with the support of a subsidy under the Dutch Good Growth Fund. This firm is not considered locally-owned because although the Ethiopian partner owns 25% of the company, he has no meaningful involvement in the business. Among the 15 Ethiopian-owned firms, four types of Ethiopian ownership could be identified. Five firms are owned by indigenous Ethiopians and are part of a family business, which could be considered a diversified business group, given that the family had firms in various other sectors of the economy. Another five firms are owned by Ethiopian diaspora who had foreign citizenship and lived abroad for a long period before they returned to Ethiopia. These diaspora investors run one or more businesses alongside floriculture, and some set up their floriculture firm under an existing umbrella of their family business. Two firms are owned by political parties of the ruling coalition, under the Tigray endowment fund and the Amhara endowment fund.

Of the remaining three locally owned firms, two firms are owned by Mohammed Hussein Ali Al-'Amoudi¹⁶, an Ethiopian-Saudi billionaire with a business empire in Ethiopia, and one firm is owned by his brothers. However, only one of Al-Amoudi's firms is included in the local firm survey, because it only became clear at a later stage in carrying out the survey that there were 3 firms linked to Al-Moudi, and not just one. Most of the available databases identified the two Al-Moudi firms under a single name, and the firm owned by his brothers' firm was listed as having foreign ownership.¹⁷ My attempts to schedule interviews with the additional two firms were not successful. Although some general information about these firms and their position in the market was collected through interviews with experts and end-market actors, the data is not sufficient to include the two firms in the full analysis of local firms' technological capabilities in this paper.

The 13 firms included in the local firm survey are listed in Table 3. The firms are anonymized and thus listed as Firm A-Rose, B-Rose and so on. These 13 local firms are rose growing firms that have been operating in the industry for five to 13 years and on average have 45 hectares of

¹⁶ In table 3 ownership of Al-Amoudi's firm is mentioned as diaspora for the sake of anonymity.

¹⁷ This firm (owned by Al-Amoudi's brother) was once reported as a joint venture and later changed to foreign. This might be correct as the official nationality of firm owners can be foreign. However, unlike Al-Amoudi's firm, his brothers' firm was not identified as a local firm during triangulation with key informants.

land. As of June 2016, on average, each firm cultivated 19 hectares of land with 12 rose varieties and hired 464 workers.¹⁸

The flower farms typically appear in clusters and are located at various altitudes ranging from 1600 meters to 2500 meters above sea level. The clusters are commonly named after the closest town, such as Ziway, Debrezeit, Sebeta, Holeta, Koka and Bair Dar. As indicated in Table 3, most of the Ethiopian-owned firms are located in the Debrezeit cluster (5 firms) and the Sebeta cluster (5 firms) but some firms are located in the Holeta, Bahir Dar and Awash clusters. Over 60% of their products are intermediate roses (50-60 cm length), followed by T-hybrid (60-80 cm) and sweetheart roses (30-40 cm), which make up the smallest share.

Although the clusters are located at slightly different altitudes, ranging from 1800 meters to 2500 meters, it is only the altitude of Holeta that makes a significant difference in product characteristics. For instance, firms in Debrezeit and Holeta can grow roses with similar stem length but with a significant difference in head size since the roses grow slowly in Holeta, resulting in a heavy stem and a larger head size. Generally, such roses fetch a higher value in the market but yield fewer stems per hectare compared to roses grown in the other clusters. In subsequent discussions, this unique characteristic of Holeta is considered.

¹⁸ Some firms almost completely utilized their land holding, while other firms had land of considerable size that was not cultivated.

Table 3: Overview of Ethiopian-owned Floriculture Firms¹⁹

Firms	ownership	cluster	export starting date	land holding size (ha)	cultivated land size (ha)	# of varieties	# of workers	End market share (%)	certificates
A-Rose	indigenous	D/zeit	2005	36	26	14	550	Auction 64% e-trader 22% Middle east 13% Japan 2%	FFP CoP-Silver
B-Rose	indigenous	Sebeta & awash	2003	126	27	12	710	Auction & e-trader 70% Middle east 30%	MPS-ABC
C-Rose	diaspora	Holeta	2006	28.4	16	11	400	Auction 70% Middle east 20% Japan 10%	MPS-ABC, SQ
D-Rose	indigenous	Sebeta	2006	30	20	16	520	Auction 2% Direct 43% (NL, UK, France) Middle east 50% Japan 5%	CoP-Silver MPS-SQ
E-Rose	diaspora	D/zeit	2005	20	15	11	420	Auction 74% Auction-direct 25% Middle east 1%	FFP
F-Rose	diaspora	D/zeit	2009	40	10	7	260	Auction 100%	MPS-ABC, SQ
G-Rose	diaspora	Sebeta	2006	20	18	18	300	Direct-50% (Spain, Italy, Greek) Middle east 50%	Bronze
H-Rose	party	Sebeta	2010	17	5	4	160	Auction 100%	Bronze
I-Rose	indigenous	Awash	2005	39	11.5	6	200	auction & e-trader 100%	Bronze
J-Rose	party	Bahir Dar	2011	124	38	21	955	Auction and e-trader 85% Direct 10% (Russia & Italy) Middle east 5%	MPS-ABC
K-Rose	indigenous	Sebeta	2008	54	27	16	675	Auction 75% Direct 10% (NL and Norway) Middle east 15%	FFP CoP-Gold
L-Rose	diaspora	D/zeit	2006	31	17.5	15	480	Auction 85% e-trader 5% Direct USA 10%	FFP Fairtrade
M-Rose	diaspora	D/zeit	2008	22	12	7	400	auction-100%	MPS
Average				45	19	12	464		

¹⁹ Firms usually report their export via the Dutch auction and e-trader as one but sometimes they gave separate estimate about the average share that is traded via the auction and sold by the e-trader. In that case, it is accordingly indicated in the table.

Part II: Technological capabilities of Ethiopian-owned Flower Firms

In the second part of the paper, the capabilities and competitiveness of these eleven Ethiopian-owned firms are measured and analyzed. It explains the methodology used to construct and measure capabilities. The technological capability approach was combined with the global value chains approach to develop a capability matrix that identifies the core capabilities required to enter and operate in the floriculture global value chain. This matrix guided the design of the local firm survey, which includes questions to capture data on core capabilities that are used as indicators. The survey data on each indicator was assessed to create sum scores on each capability category, as well as an aggregate capability score. This part of the paper maps the individual and aggregate capabilities of the Ethiopian-owned firms and then compares the aggregate capability scores to a series of competitiveness measures. The comparative analysis reveals the dynamics and complexity between capabilities and competitiveness. The concluding section discusses three export trajectories identified among the local firms based on their end-markets and market channels.

Technological capabilities required in floriculture global value chain

The horizontal axis of the floriculture GVC technological capabilities matrix in Table 4 describes the categories of capabilities required in the industry: investment, product, production, harvest and post-harvest processes; logistics, finance and services linkages; input supply chain linkages; and end market linkages. Entering production of cut-flowers for export requires a large investment capacity to set up production facilities and source inputs as well as to hire and train workers. Along with finance, firms need access to cool-chain logistics from farm to airport, cargo booking and handling services.

The complexity of each category of capabilities increases depending on the targeted end-market and the market channels, as indicated on the vertical axis of Table 4. The literature on the floriculture global value chain generally considers the direct sales marketing channel to the European Union to require greater capabilities than the Dutch auction marketing channel. However, firms selling mainly via the Dutch auction may diversify or adjust their product, process and marketing strategies, which require new capabilities, rather than moving into direct sales to the European Union. Selling to the Middle East is considered to require a lower level of capabilities than the Dutch auction marketing channel and is the easiest end-market for firms to access. Thus, four rows are included in the Ethiopia floriculture matrix: basic production capacity, Dutch auction, strategic diversification and direct sales to European Union markets.

To sell via the Dutch auction firms need to meet stringent minimum requirements related to plant health, quality sorting, grading and packing that necessitate extending their capabilities beyond the basic production capacity capabilities described in the first row. However, to strengthen their competitiveness and prices received in the auction channel, firms need to deepen their basic production capacity capabilities: expanding varieties, upgrade greenhouse technologies, regularly train workers and improve product quality (stem length, head size, colour), production, harvest and post-harvest processes as well as improve data recording and management information systems. At the same time, firms could improve and control cool chain and logistics to prevent/minimize quality deterioration until the products reach the end-market. They can also increase their market knowledge and ability to exploit services provided by the auction by collecting information on buyers as well as working on feedback from buyers or unpacking agents at the auction regarding their quality and reliability. In turn, the firms can engage in direct marketing or ‘auction-direct’, which is a kind of direct sales but facilitated by the auction itself. Although certification is not required by the auction, it is important to take on sustainability standards (business-to-business and/or consumer labels) that are most commonly adopted by competitors, such as MPS-ABC, GLOBALGAP and Fair Flower and Fair Plants. Furthermore, firms build relations with breeders in order to get exclusive varieties, which are important for meeting the requirements of the dominant auction buyers (such as florists) that have a higher demand for exclusive varieties and high value/quality products.

Firms selling to Europe primarily via the direct sales channel, especially to supermarkets, need to have greater capabilities to ensure consistency, reliability and flexibility in terms of meeting buyers’ specifications. Deepening capabilities in direct sales channels involves vertically integrated chain operations, especially in logistics and marketing, as well as adding more value to products such as delivering ready-to-use bouquets. However, there seems to be no guarantee that the additional capabilities required in this channel will be compensated with a higher price. In addition, the price is generally volatile in both auction and direct sales channels due to instability in global demand, which is a broader challenge of the floriculture global value chain. Weighing risk and reward, firms could stick to the auction channel instead of going to direct sales, adopting a strategy of deepening their capabilities in the auction channel in order to increase their chance of fetching a higher price there. Thus, selling via direct sales might require higher capabilities than selling via auction, but using the auction channel is not necessarily an indicator of a lower level of capabilities.

As indicated earlier, firms might target multiple end-markets and market-channels as strategic diversification, which relates to diversifying end-markets or products. Firms might enhance

their bargaining position vis-à-vis their European buyers if they have alternative markets. Firms might also make more profit if they sell to other end-markets where the marketing and transport costs are lower. Marketing costs could be lower where buyers do not have high requirements and demand compliance through certifications. For these reasons, a competitive net price could be achieved in end-markets outside of Europe. This also holds for the so-called ‘lower value’ end markets such as regional and domestic supermarket chains, where producers who have export experience to the European market tend to benefit more than their competitors as they already possess capabilities to meet requirements that are just emerging or yet to emerge in the lower value end markets (Barrientos et al 2015). Diversifying end markets can be also pursued as a strategy of ‘stabilization’ when firms face a crisis in meeting the demand in their original market such as Europe (Whitfield 2016). The contemporary floriculture global value chain is characterized not only by stiff competition but also by the emergence of new demands and south-to-south trade. Thus, diversification can be seen as a strategic move in relation to getting a ‘better deal’, which can be part of a learning process in building technological capabilities.

In any case, in order to build such important capabilities, firms need to link up with various private and public institutions that render general as well as sector specific supports. For example, collective action among firms through an industry association can help to improve the overall position of the industry, as well as individual firms, by addressing industry-wide constraints. By linking with the government sectoral agency, firms can access sector-specific support such as foreign experts and trained labor, as well as get the government to improve the implementation of general services such as power supply, roads and telecommunications for the sector. Linkages between firms and the government sectoral agency, whether formal or informal, can also serve as a platform for discussing challenges facing the industry and possible solutions.

Table 4:
Floriculture GVC technological capabilities matrix

	Investment	Product and Production process			Linkages		
	Investment	Product	Production process	Harvest & Post-harvest process	Logistic, finance & services	Input supply chain	End market
Basic production capacity	Selection of varieties, Choosing location & type of greenhouse and other equipment; construction of service blocks (pack house, stores)	Meet minimum quality req. of targeted market (e.g. Middle East)	Basic farm management system and data recording; hire and train managers & workers; meet Bronze-level requirements	Cutting at the right stage, at right length, at right position; transport to pack house; Defoliating, grading, bunching, trimming; packing; quality control Cool chain on farm	Access to cool chain from farm to airport; access to cargo booking and handling services; access to finance;	Source varieties from breeders Source quality packing materials; chemicals and fertilizers	Find buyer; negotiate; build relation
Dutch Auction	Expand land holding (req'd to expand varieties); upgrade greenhouse technology; cool chain on farm; inventory and storage system; Conducive and safe working environment	Increase number of high value varieties, Increased certifications/labels & use for product differentiation, Improve vase life, packaging	MPS-ABC; CoP-Silver (Globalgap); Monitoring production process to improve efficiency & increase yields of products that meet specifications (stem length, head size), as well as re-evaluate/change production strategy; Increase training of staff; communicate HR policy; Basic agric R&D.	Monitoring and improving all processes	Improve cool chain management; Increase reliability and consistency in delivery; Create own logistics company, or in collaboration with other firms Access to sector specific and other services	Relations with international consultants, breeders, other firms to discuss farm activities and gain knowledge; Collaborating in collective schemes to buy inputs, arrange transport logistics and handling; Vertical integration of upstream or downstream functions: packaging materials, propagating planting materials	Provide product information at acceptable level of accuracy; appear regularly on the auction clock; Appear on all auction days consistently score high in grading and reliability index Relation with auction service to improve grading score and reliability index Negotiate directly with buyers. Increase market intelligence gathering. Participating in trade fairs
Strategic diversification		Diversifying into non-flower products (fruits, veg, etc)	Farm management systems and staff training to deal with diverse production processes of new products.				New end markets: global (e.g. Japan), regional and domestic. Finding buyers and building relations; multiple marketing strategies
Direct Sales	Expansion—higher volumes req'd	Varieties dictated by buyer; packaging presentation, Ready-to-use bouquets	B2B and consumer Labels/certifications req'd;		Integrated cool chain management; just-in-time delivery		Own marketing & distribution centers

Measuring the Technological Capabilities of Floriculture Firms

The floriculture technological capabilities matrix guided the construction of the local firm survey questionnaire (see Annex 1). The survey questions captured a firm's performance across the categories of capabilities, and their depth within each category in relation to marketing channel and strategic diversification.²⁰ The questionnaire included both quantitative indicators and qualitative measures, including open-ended questions. Although the questions were largely aimed to examine the current conditions of the firms at the moment of the survey, firms were asked about their past situations related to initial experience and investment capabilities. The questionnaire was relatively long, but not all questions were relevant for all firms. If the interviewee was pressed for time, the questionnaire indicated the 'must ask' questions in bold, which were asked in all instances in order to have a minimum base of comparable data.

The questionnaire was administered to the following flower firms: ZK flower, Dugda flower, Yassien (Sunrise) flower, Enyi flower, Tinaw flower, ET-Highland flower, Tanaflora, Minaye flower, Super-arsity flower, Ethio-agri-ceft flower, Selam flower, Rainbow flower and Saron flower. In most cases, the owners were interviewed (seven of the 13 firms), and in the absence of the owner, the top managers (general managers and sometimes farm managers) were interviewed. Occasionally both owners and managers were interviewed in order to capture information for all sections of the questionnaire. For half of the firms, the interview was conducted at the farm site, while for the rest it was done at their head office in Addis Ababa. The firm names are anonymized in the rest of the paper in order to respect firms' preference for anonymity when publishing the results of the study.

Based on the survey results, the indicators in the capabilities matrix were reformulated into four categories of capabilities for the purposes of qualitative assessment, which involved selecting key indicators of each capability category. The four categories are product and production process, input integration, linkages and end-market. Product and process capabilities were consolidated into one category because the indicators for product and production processes are interrelated. The linkage capabilities are kept as three separate categories that are the same as the matrix in Table 4: input integration, linkages (to service providers, national institutions, industry association and other firms in the industry) and end-market. In the reformulation, it is intended to emphasize end-market, as it is not only a capability category but also a strong determinant of functional complexity (on the vertical axis). In addition, it was found that the ability of local firms to propagate plants in-house and to import inputs directly for themselves was important in the Ethiopian national context, and thus input integration is kept as a separate category.

²⁰ The order of the questions in the questionnaire in Annex 1 do not directly correspond to the matrix, as they had to be ordered in a way that made sense for an interview.

The investment capability category was not included in the assessment exercise for two reasons. First, the investment category is partly concerned with past capabilities such as initial experience, search effort as well as the investment capacity of firms. The survey result showed that firms were largely at a similar level of experience and investment capacity initially (at the time of investment), so firms would have the same score in this category. Therefore, investment capabilities are not included in the scoring table, but the survey results related to investment capabilities are discussed in the qualitative analysis. Another reason not to include investment capabilities separately in the scoring is that, the current investment capabilities of firms (at the time of the survey) is implicitly measured in all other indicators as it is an on-going process embedded in and manifested by the other four categories.

Several questions were selected from the survey questionnaire as indicators for each of the four capability categories. The selected questions, and thus indicators, include both quantitative and qualitative questions. In other words, questions where the answer was a number, and questions that were open-ended. In this way, indicators are not biased towards what can be counted. For open-ended questions, the firm is scored based on a subjective assessment of the firm's performance using the answers provided by the interviewee. Where possible, the direct response of the interviewee is used but crosschecked with other responses in the questionnaire to confirm the validity. The exact method of scoring is explained below in the context of each indicator included in the scoring table.

Five indicators were selected to measure the product and production process capabilities of firms: (1) number of varieties, (2) number of export days per week, (3) internal reject rate, (4) average labor turnover rate and (5) certification. *Number of varieties* is assumed to indicate a firm's ability to handle more varieties, which requires specific knowledge about how to produce each variety. It also indicates a firm's potential to reach different market channels, as some literature shows a correlation between the number of varieties and participation in the direct sales marketing channel (Gebreeyesus and Sonobe 2009). However, it is not clear how large the numbers of varieties should be for firms to participate in direct sales. Moreover, the study by Gebreeyesus and Sonobe (2009) refers only to direct sales to European supermarkets; there are other European and non-European buyers who use the direct sales channel and who might have different requirements than supermarkets.

In relation to the *number of export days per week*, exporting for more days indicates a higher capacity of firms in shipment planning and forwarding to end-markets. Additionally, it shows greater market presence, which is important in finding new buyers and establishing a position in a market. The third indicator is *average internal reject rate*. The lower the internal reject rate is the better the firm's ability in maximizing efficiency or profit is. Moreover, it can also imply a stronger production process that can generate export standard products with fewer rejects. For scoring, the overall experience of the industry is considered. An industry expert confirmed that the average internal reject of the Ethiopian

industry is five percent; given that the industry is dominated by foreign firms, including the Dutch-owned firms, the Ethiopian industry standard roughly reflects the international standard.

The fourth indicator of product and production process capabilities is the firm's *rate of labor turnover*. A lower turnover rate indicates a firm's ability in increasing efficiency and productivity, as labor would be stable enough to master and adapt the work. The final indicator is *certification schemes firms adopted*. Certification indicates product and production processes that meet an international business standard, as well as a firm's ability in producing a differentiated product with a broader potential to cater to various market segments or niche markets. The score is given depending on the types of certificates firms adopted.

Input integration refers to a firm's capability to source inputs measured using two indicators: *importing fertilizers and chemicals internally* and *in-house plant propagation*. These indicators were selected because of their relevance in the global industry as well as the conditions in the Ethiopian national context. Local firms reported that it was cheaper and safer in terms of quality and availability if they could import inputs (fertilizers and chemicals) directly and propagate plants internally, rather than buy these inputs from local importing firms and propagation firms. Neither of the key inputs (fertilizers and chemicals) are produced locally, yet. Thus, if a firm is capable of importing directly a large share of its inputs rather than buying from an independent importer, and if it can operate in-house propagation of plants instead of buying from propagators in the domestic market, it indicates a firm's stronger financial, logistical as well as technical capabilities in supply chain management.

Three indicators were selected to measure the linkage capabilities of local firms because the industry association in Ethiopia focuses mostly on general services that are relevant and can be made available for all members alongside lobbying government and many inter-firm linkages, especially knowledge sharing, which take place outside the formal institutions of the industry association. Therefore, in addition to participation in an industry association and linkages with national institutions, firms were asked directly about their linkages with other firms. Two sets of questions combined with a subjective assessment were used in scoring each indicator. The first indicator is a *firm's linkage with other firms in the industry*: here firms were asked to rate their participation in any kinds of collaborative schemes (formal or informal) with other firms as limited, medium or high. Then they were asked to list the activities or schemes in which they participated. Based on the listed activities, I made a subjective assessment to give the final score. For instance, visiting other firms was considered a lower cooperation than jointly hiring consultants with other firms. The second indicator is a *firm's linkage with the industry association*. Firms were asked to rate their participation in the industry association as limited, medium or high, and then asked to list the activities and services in which they participated. Based on the activities listed, I made a subjective assessment to give the final score. The last indicator is a *firm's linkage with sector specific and research institutions*. Here also the same three

steps applied to do the final scoring. In all three indicators, a better or stronger linkage is assumed to indicate a greater capability of a firm.

The end-market capability category refers to the overall capabilities of firms to meet the specifications of several buyers in different markets, their ability to establish stable relations with those buyers and their market knowledge and promotion skills. It is measured using four indicators: *number of end-market regions*, *number of direct buyers (in direct sales or auction-direct)*, *relation with buyers and marketing capability*. For the first two indicators, it is assumed that the higher the number of the end-market regions or the number of direct buyers that the firm has, the higher the capability of the firm. In the last two indicators, however, three steps were applied. In the case of relations with buyers, firms were asked to rate their relations with their direct buyers as stable, somewhat stable or ad-hoc. If they rated their relations as 'stable', then they were asked with how many of the buyers they worked for more than a year. A subjective assessment was applied in reaching a final score. For instance, if a firm has relations with half of its buyers for at least a year, 'stable' is granted; otherwise, the score is lowered to 'somehow stable'. However, for buyers in the Middle East region, the method of payment (credit or advance payment) is used to assess buyer relations, since firms indicated that they could sell to buyers in the region on a credit basis only if they have stable relations. The last indicator is *marketing capability*, which is defined as the ability of a firm to develop a clear market strategy and implement coherent marketing activities such as market intelligence, promotion and branding. Here the final score is the composite of several separate questions that were asked in different sections of the questionnaire, and in some of them, the three steps are followed. Firms were asked whether they have a marketing strategy; to list their marketing activities, promotion and branding, and how often they do them; and whether they have a marketing unit to do those activities. Their responses were subjectively assessed largely based on the level of investment, coherence and consistency.

The scores for each of the local firms on all of these indicators are presented in Table 5, along with aggregate scores for each capability category. Box 1 contains further details on the scoring on each indicator, explaining what constitutes a low, medium and high score. Two firms (H-Rose and I-Rose) are not included in Table 5 as they could not produce the required data during the firm survey. These two firms appeared to be on the verge of collapse at the time when the survey was carried out and had not exported for at least the preceding three months.

Table 5: Technological Capabilities Indicator Scores of 11 Ethiopian-owned Firms

Firms/Capabilities	(1) Product and production process						(2) Input integration				(3) Linkages				(4) end-market				
	number of varieties	numbers of export days per week:	internal reject rate	certificates	labour turnover rate	*sum score	importing inputs internally	in-house propagation	**sum score	linkage with other firms:	linkage with association	linkage with sector-related and research institutions	***sum score	number of end-markets by regions	§ number of buyers in direct sales/auction direct:	relationship with buyer	marketing	****sum score	
	A-Rose	3	3	3	1	13	3	2	5	2	3	1	6	3	2	3	1	9	
	B-Rose	3	2	1	2	1	9	1	2	3	2	2	1	5	2	1	1	5	
	C-Rose	1	3	3	2	1	10	3	1	4	2	2	1	5	3	3	3	10	
	D-Rose	2	2	2	2	3	11	3	1	4	3	3	1	7	3	3	3	11	
	E-Rose	1	3	3	3	3	13	3	1	4	3	3	1	7	2	1	3	9	
	F-Rose	1	2	3	2	2	10	1	2	3	2	2	1	5	1	1	3	7	
	G-Rose	3	3	2	1	3	12	3	2	5	1	1	1	3	2	3	3	10	
	J-Rose	3	3	2	2	1	11	3	2	5	2	3	1	6	2	1	1	5	
K-Rose	2	3	3	3	2	13	3	1	4	2	3	1	6	3	2	2	9		
L-Rose	2	2	3	3	1	11	2	2	4	2	3	1	6	2	1	2	7		
M-Rose	1	1	2	2	1	7	2	1	3	2	3	1	6	1	1	3	2	7	
Note: sub-scores :Low=1, Medium=2, High=3 *Sum: Low=5-8; Medium=9-12; High=13-15 **Sum: Low=2; Medium=3-4; High=5 ***Sum: Low=3-5; Medium=6-8; High=9 ****Sum: Low=4-6; Medium=7-9; High=10-12 §Auction direct refers direct market arranged or facilitated by the auction system so if firms have direct buyers via auction direct system, it is considered as having buyers in dire sales																			

Box 1: Scoring of Indicators in Table 5

Product and production process:

i) *number of varieties*: firms that have seven to eleven varieties scored Low; 12 to 16 varieties scored Medium; 17-21 varieties scored High.

ii) *number of export days per week*: firms that export for four days a week scored Low; five to six days scored Medium; and firms that exported seven days a week scored High.

iii) *internal reject rate*: firms with the internal reject rate of six percent and above scored Low; five percent reject rate scored Medium; and below five percent reject rate scored High.

iv) *average labour turnover rate*: firms with labour turnover rate above 20 percent scored Low; 11-20 percent scored Medium; and with turnover rate below 10 percent scored High.

v) *certification*: firms that have certified for Bronze level of the local standard scored Low, firms with B2B (MPS-ABC, SQ) scored Medium; and firms with business-to-business & consumer labels (FFP, Fairtrade) scored High.

Input integration:

i) *importing inputs internally*: firms that locally buy all or imports only sensitive chemicals and fertilizers scored Low, importing around 50 percent of inputs internally scores Medium; and importing over 50 percent scores High.

ii) *in-house plant propagation*: Firms that operate propagation internally scored High; and firms with no internal propagation facilities scored Low.

Linkages:

i) *with other firms*: firms that have limited cooperation with both local and foreign firms scored Low; firms that cooperate with both local and foreign firms with some general competencies such as sharing experience, hiring consultant jointly, visiting each other's firm scored Medium; and firms that cooperate with both local and foreign firms in some core competencies such as marketing scored High.

ii) *with EHPEA*: member of the association but limited participation in meetings scored Low; members that sometimes attend meetings and use services scored Medium; and members that participate in meetings and actively take advantage of the services scored High.

iii) *with sector-related institutions and research institutions*- no or limited link is scored Low; medium links such as accessing some supports scored Medium; and close links scored High.

End-market:

i) *number of end-market regions*: firms that export to one region scored Low; two regions scored Medium; and firms that export to three regions scored High.

ii) *number of buyers in direct sale/auction-direct*: firms that have one to three direct buyers scored Low; with four to seven buyers scored Medium; and firms with eight to ten buyers scored High.

iii) *relation with buyers*: firms who viewed their relation as ad hoc scored Low; Somewhat stable scored Medium and Stable scored High.

iv) *marketing capability*: firms that have no clear strategy linked to its marketing activities score Low; firms that depend primarily on their personal networks and firms that recently (in 2016) began implementing some market activities guided by their strategy scored Medium; and firms that have clear market strategies and implemented activities accordingly in a regular fashion scored High.

Mapping the Technological Capabilities of Ethiopian-owned Firms

Initial experience and investment capabilities. Although the Ethiopian floriculture industry was pioneered by local entrepreneurs, the pioneer local firms had no initial experience in the sector. The same applies to the 11 local firms included in the firm survey in 2016. These local firms reported undertaking similar investment preparations to enter the sector, such as conducting a feasibility study with help of both local and foreign consultants. They set up their firm with similar physical, operational and organizational structures, and they have similar modern greenhouses that are furnished with drip irrigation and computerized fertigation system. Only one firm (C-Rose) has a greenhouse with advanced technology such as climate sensors, which was required by its location at a higher altitude with relatively disease prone and challenging climate conditions. All of the local firms began operations with expatriates²¹ hired as consultants and/or as managers in some key positions. These expatriates, mainly from Kenya, India, Israel and the Netherlands, were the principal source of technology transfer, as they played a significant role in setting up the businesses (especially operational and organizational structures) as well as training key staff and managers. In addition, almost all of the firms selected their initial market channel and varieties based on the advice of these foreign consultants.

All of the local firms have invested in learning and undergone significant changes since the initial investment period. For instance, all expatriate managers have been replaced with local ones, and consultants are hired only by a few firms and for shorter periods than before or only for specific needs. Regarding variety selection, all firms have learned about the greater risk associated with it, giving more attention and investment in selecting varieties than before. As one grower puts it ‘variety makes you or breaks you’. Local firms used consultants’ advice, imitation and the feedback of unpacking agents at the Dutch auction as mechanisms to learn about varieties. They also now reach out to buyers in different end-markets, channels and trade fairs to get more feedback that can help them to better understand the market trends and consumers’ tastes. In addition, some firms visit other farms in the country and abroad (mainly in Kenya) to gain insight on the characteristics of varieties. After such careful variety selections, most of the firms conduct a ‘variety trial’, which involves testing a variety for its growth, productivity, disease susceptibility, color, vase life and so on. This is especially crucial if there is no other farm in the neighborhood (in similar climate) that grows the same variety.

Local firms have somewhat increased their capabilities in marketing. All farms joined the floriculture business with the Dutch auction in mind, as it is the most important global market

²¹ The expatriates might include foreigners who were already living/working in the country or who came to the country for the specific job in the flower firms.

and is easily accessible to all. At the beginning, market intelligence was low on the priorities of local firms; rather, they concentrated on building their rose producing capability in order to meet the requirements of the Dutch auction. But over time marketing capability became one of the primary concerns of all operating local firms, and the great majority are striving to diversify market channels and end-markets, as shown in Table 3.

Product and production process capabilities. Except for one firm (M-Rose), all local firms scored medium or above on the sum score for product and process capabilities. Firms reported that they export seven to 21 varieties, and most of them export over 12 varieties while only two firms export below 10 varieties. This implies that all firms have developed considerable capabilities in dealing with a larger number of varieties. Moreover, the number of varieties that a firm can supply to market demonstrates its potential to expand its reach. In the Dutch auction, firms can easily clear large volumes of a single variety or a few varieties of flowers; whereas, the direct sales channel tends to require a large number of varieties but in smaller volumes. Most of the local firms export every day, with only one firm (M-Rose) exporting just four days a week. Regarding firms' rate of internal reject, only one firm (B-Rose) has a higher reject rate than the average of the national industry (5% reject), while the rest have below or equal to the industry average rate. However, despite their effort to export only top-grade flowers, some firms mentioned that their flowers are sometimes re-graded at the auction.²²

The capabilities of local firms in relation to product and production process were further assessed based on their average rate of labor turnover and their adoption of international standards (indicated by certification). Most of the firms indicated that they faced challenges in keeping labor stable or in securing a year-round sufficient labor force. All firms provide permanent employment contracts, as required by the national regulations, and they pay a minimum wage of 750 to 900 ETB (equivalent to USD 35-42²³) per month. In addition, all firms, except G-Rose, have some incentives schemes and benefits for workers, and all firms, except for B-Rose and G-Rose, reported that they provide regular training on work and safety related issues. Despite these strategies, most of the firms still face a relatively high rate of labor turnover and/or labor shortage. However, this is not unique to the local firms, but rather is a phenomenon that characterizes the entire industry (Abebe and Schaefer 2015; Oqubay 2015). All of the local firms adopted international standards such as MPS, Fair Flower and Fair Plants

²² Firms were asked to estimate the re-graded percent of flowers, but they were reluctant to give a specific figure. They only mentioned that the overall market reject rate is less than 1%. Re-grading of flowers happens occasionally, but the flowers will still be sold at a lower price.

²³ The approximate exchange rate of June 2016 is applied (1USD = ETB 21.6096) based on <https://www.oanda.com/currency/converter/>.

and Fairtrade, except G-Rose which only has the required local standard (Bronze Level). As mentioned earlier, certification is both a tool for marketing as well as for improving the production process. MPS-ABC is a widely adopted certificate scheme in the global floriculture industry as well as among local firms. Apart from G-Rose, all local firms adopted at least MPS-ABC, which requires good agricultural practices and environmental protection. But if a firm is certified for MPS-ABC and SQ, such as D-Rose, it must also adopt a protocol that directly or indirectly influences labor processes and management. Although certificates or standards are not required to access the Dutch auction, it is a common norm that most of the suppliers (over 80%) are certified for MPS (Rikken 2010). Furthermore, these requirements get more stringent with consumer labels, which also serve as important instruments to differentiate products and open up opportunities to enter certain niche markets. Fair Flower and Fair Plants (MPS-A +SQ) and Fairtrade are consumer labels, and 36 percent of the local firms are certified to one or both of these labels. The local standards, of which Bronze Level is presumed to be a statutory minimum, focus on basic farm management systems, safety and protection of workers and environment. However, in practice, Bronze Level is poorly enforced.

Input integration. Technological capabilities of firms are further measured by looking at firms' ability to organize major inputs. The two indicators show firms' capacity to import inputs and to propagate their own plants in-house. Chemicals, fertilizers and packaging materials are the most important inputs needed in the cut-flower sector. While packaging materials are produced in Ethiopia, chemicals and fertilizers are fully imported either by independent importing companies in the country or by flower firms themselves (importing internally). All firms indicated that importing all inputs internally, including packaging materials, is cheaper (by 15% to 30%) and safer (in terms of quality and availability) than buying it from independent importers or local producers. However, because of its huge financial implications, most of the firms are forced to limit the share of internally imported inputs. Most of the firms import over 50% of their chemicals and fertilizers internally, while buying a larger share of packaging materials locally, but there are a few exceptions such as G-Rose, which imports all inputs internally. Similarly, although propagation services are available locally, firms and experts in the sector think that vertically integrating the activity into the firm is significantly more efficient than buying from local providers, as it permits local firms to control the process as well as costs. Thus, importing a larger share of inputs and having in-house plant propagation not only implies that a firm has higher financial, logistical and technical capabilities but also that the firm is better able to minimize costs. The financial challenges regarding input integration are mainly related to accessing foreign exchange rather than working capital. As there is often a shortage of foreign exchange, National Bank directives regulate access. Even though exporters might have

some privileges, they are inadequate to completely alleviate the challenge of accessing the foreign exchange.

Linkage capabilities. All firms reported good linkages with their service providers, including financial services, cargo transport services and breeders' services (access to and advice on variety) and all firms own cool-trucks for local ground transportation of flowers. However, there is some variation on the indicators measuring linkages with other firms in the industry, with sector specific institutions such as EHPEA, EHDA, and with knowledge institutions such as universities and research centers.

Local firms have a certain level of cooperation amongst themselves as well as with some foreign firms. Geographical proximity (clusters) is important to develop certain types of cooperation such as frequent contact between managers, information exchange and collectively hiring consultants. However, clustering does not seem to matter to cooperate on core activities such as marketing. The firm E-Rose developed cooperation with foreign firms (Dutch and Indian) to enhance its marketing capabilities. Additionally, friendships, between some local and foreign firms, have emerged and resulted in knowledge transfer in an informal environment. For example, K-Rose mentioned that it sees one Dutch firm as its model farm, and it has close business interactions with the owner that developed into a friendship.

Regarding linkages with institutions, the local firms only acknowledged their industry association (EHPEA) as a vibrant and useful institution with which most of them have a good connection. Apart from representation, the EHPEA is an important node linking them with the global industry as well as with some national institutions. Most firms (more than 60%) reported that they actively participate in association meetings and access services provided by the association, while a few firms mentioned only occasional involvement and one firm (G-Rose) reported that its link barely goes beyond a membership. During the period of the firm survey fieldwork, nine of the 11 firms participated in training that was jointly organized and financed by the industry association and the Dutch CBI.²⁴ A few firms reported traveling to the USA to promote their products with the help of the association. In contrast to strong linkages with the industry association, all firms reported weak linkages with other support or research institutions. Most of them described EHDA, the lead government agency which was once a very important and supportive institution, as a dead organization (የሞተ ሆኖታል), and some said 'the honey-moon is over!', to denote the diminishing of the government's support and enthusiasm towards the sector.

²⁴ The training included individual firm coaching and on-site training focusing on marketing, post-harvest and cool-chain management and corporate social responsibility with a focus on gender and human resource management. It began in 2015 and continues until 2017.

End-market. Local firms have been making an increasing effort to diversify their end-markets. Five regions are identified as destinations of flowers exported by local firms: Western Europe (the Netherlands and UK), Southern Europe (Italy, Spain, and Greece), Middle East (Saudi Arabia and UAE), Northeast Asia (Japan and Korea) and North America (the USA).²⁵ Each firm exports to one to three regions, but the majority of them export to more than one region. Five of the 11 firms export to two regions, while four firms export to three regions. In addition, nine of the firms are engaged in direct sales (including auction-direct), and most of them have more than five direct buyers, while the rest (except one, L-Rose) have two to three direct buyers.

In the floriculture global value chain, consumers' tastes can vary across regions. In addition, countries set distinct and sometimes overlapping regulations on products that enter their jurisdictions. For instance, as explained by some firms, Japan's national regulation has near zero tolerance for pests. If a single pest is found, the whole product needs to go through a fumigation procedure, at a great cost to the supplier firm. The Dutch auction, or the European market in general, has its own minimum requirements regarding pests but is relatively less strict than Japan and some parts of the United States. Some countries in the Middle East have less strict requirements and weak enforcement mechanisms than all the other regions mentioned.

Furthermore, consumers in the Middle East prefer relatively matured roses or roses at a higher opening stage (e.g. stage 4), while the Dutch auction requires roses of an earlier opening stage (opening stage 2).²⁶ Such variation across regions has implications for firms' capabilities in meeting distinct legal and market requirements. Moreover, specifications of individual buyers often go beyond these general conditions (legal and market) as they have their own requirements in relation to, for example, quality, volume and delivery. However, buyers in the Middle East and Southern Europe have less stringent requirements and yet offer a better price compared to other end-market regions.

Even though having larger numbers of export destinations and direct buyers can indicate higher levels of technological capabilities, as firms have to meet the requirements of diverse end-markets, it does not necessarily show how good firms are at meeting these specifications in a consistent manner. Some qualitative assessment can help to balance the measures of end-market capabilities. To this end, firms' relations with buyers and their overall marketing capabilities were assessed. These issues are important in the global industry, which is characterized by stiff competition where the supply of flowers often surpasses the demand. To remain competitive,

²⁵ Two firms reported selling to France and Norway but it is often done through the Netherlands.

²⁶ Opening stages refer to maturity level of roses. Roses with early opening stage (stage 2) have a tighter flower head with less visible colour and it opens slowly and can have longer vase life, while the opposite is the case for roses with advanced opening stage (stage 4).

firms not only need capabilities to find buyers (in the case of the auction, to track their frequent buyers) but also to build relations with them. This process typically involves issues beyond meeting product requirements, such as regular communication, negotiation, commitment and trust. Most of the firms that have direct buyers reported to have stable relations with half or more of their buyers, as they have had relations for over one year and are able to sell on a credit basis.²⁷ Firms that sell via the auction clock only (F-Rose and M-Rose) indicated that they trace their most frequent buyers on a regular basis and have established stable relations with some of them. However, one firm (E-Rose) took its relation with auction clock buyers one step further and established a direct sales relationship within the auction system (auction-direct).

Accessing various end-markets and establishing stable relations with buyers are largely influenced by the overall marketing capabilities of firms, which are defined as the ability of firms to develop a clear market strategy and implement coherent marketing activities such as market intelligence, promotion and branding. Unlike other indicators of end-market capabilities where several firms scored high, here only one firm (E-Rose) showed high performance, while half of the remaining ten firms scored low. These low scoring firms (A-Rose, B-Rose, and C-Rose) seem to act sporadically and lack a clear market strategy; they might diversify to a new market without necessarily conducting basic market intelligence and preparation. Some of them might invest on promotions and branding but seem to lack consistency and commitment. However, A-Rose and C-Rose have relatively larger numbers of buyers and end-markets than the firm with the highest score in marketing capabilities (E-Rose). There are also firms that have recently invested in strengthening their marketing capabilities. For example, F-Rose, K-Rose, L-Rose and M-Rose invested in market intelligence, consumer relations, business standards and regular promotions. In contrast, D-Rose and G-Rose, which have the highest numbers of direct buyers, reported to fully rely on their personal network to market their product in different end-markets without necessarily investing in business standards and branding. For instance, G-Rose is the only firm that does not have a certification of meeting any international standards and yet is able to sell in Southern Europe and the Middle East via the direct sales channel. D-Rose, which only has certification for business-to-business standard, exports to Western Europe and the Middle East via direct sales channel, which seems to contradict the common perception that consumer labels are mandatory in the European direct sales channel.

²⁷ In the absence of a guaranteed payment system as in the Dutch auction, firms depend on trust to sell on a credit basis. This is especially the case with buyers in the Middle East; firms indicated selling only with advance payment until they established trust or stable relations with buyers.

Table 6: Aggregate Technological Capability Scores of Ethiopian-owned Flower Firms

Name of firms/ Capabilities	(1) product & production process	(2) input integration	(3) Linkages	(4) end-market	(5)= 1+2+3+4 Aggregate score	Capability score
A-Rose	H	H	M	M	HHMM	High
B-Rose	M	M	L	L	MMLL	Low-med
C-Rose	M	M	L	H	MMLM	Medium
D-Rose	H	M	M	H	MMMH	Med-high
E-Rose	H	M	M	M	HMMM	Med-high
F-Rose	M	M	L	M	MMLM	Medium
G-Rose	M	H	L	H	MHLH	Mixed
J-Rose	M	H	M	L	MHML	Mixed
K-Rose	H	M	M	M	HMMM	Med-high
L-Rose	M	M	M	M	MMMM	Medium
M-Rose	L	M	M	M	LMMM	Medium

The sum scores on each capability category as well as the aggregate technological capability scores of local firms are presented in Table 6. The overall levels of technological capabilities are marked with different colors. Apart from B-Rose, all of the firms had a sum score of medium or above in most of the four capability categories, illustrating that they increased their capabilities since entering the industry. One firm had an aggregate score of high and three firms had an aggregate score of medium-high, while only one firm scored low-medium (B-Rose). Interestingly, only L-Rose had a uniform score across the four capability categories, while the rest show variation. This result implies that firms do not build all types of capabilities at the same time and to the same level. However, the degree of disparity varies from firm to firm. While some firms appear with relatively closer scores in all capabilities, others have extremely contrasting results such as G-Rose and J-Rose, which have low and high scores (i.e. mixed scores). Highlighting these dynamics is important for understanding firms' investment in learning as well as the factors that influence the process of developing technological capabilities. To this end, the final section of the paper compares the aggregate technological capability scores of the local firms with some competitiveness measures to see whether there are relationships between the two and if that influences investment in learning.

Comparing firms' technological capabilities and competitiveness

Competitiveness in the floriculture global value chain depends on productivity, product attributes and price, which indicate an inherent relationship between capabilities and competitiveness. The above discussed technological capabilities of firms have a direct or indirect influence on productivity, product and price. However, further evidence can be useful to unveil the explicit links between the two and to deepen our understanding of the links between capabilities and competitiveness in influencing the learning process of firms. To measure the competitiveness of firms, three indicators were developed using data collected in the firm survey, from EHDA and from end-market actors in the Dutch auction.

First, the export trend of firms (average growth rate of export value and volume) and firms' export share of the total export of local firms are calculated for two periods (2005-2010 and 2011-2015) using data from EHDA. As Table 7 shows, the export trends of firms demonstrate a large leap in the period of 2005-2010 or 2011-2015 due to firms starting operations; given the growth cycle of rose plants, the productivity of rose plants reaches its highest level between the second and third year of its age. Apart from firm-level issues, export trends can be influenced by land available for expansion. Therefore, the study is not interested in the magnitude of the export trend, but rather in whether the trend is positive, stagnant or negative. Table 7 shows that all local firms have a positive export trend in the first period but this changed slightly in the second period as two firms exhibit a negative trend. Interestingly, of these two firms with a negative export trend in the second period, one has an aggregate technological capability score of low-medium (B-Rose), but the other firm has a high aggregate score (A-Rose).

Table 7: Export Share and Export Trend of Ethiopian-owned Flower Firms (value and volume)

firm's export share over local firms total export and growth rate (value and volume)									
firms	2005-2010		2011-2015		2005-2010		2011-2015		Capability score
	average share volume	average share value (USD)	average share volume	average share value (USD)	average growth rate export value	average growth rate export volume	average growth rate export value	average growth rate export volume	
A-Rose	0.18	0.18	0.12	0.13	0.88	0.38	-0.22	-0.15	High
B-Rose	0.29	0.35	0.07	0.09	0.37	0.08	-0.07	-0.03	Low-med
C-Rose	0.04	0.03	0.04	0.04	0.71	0.52	0.56	0.45	Medium
D-Rose	0.14	0.12	0.10	0.09	2.36	1.37	0.03	0.01	Med-high
E-Rose	0.16	0.17	0.13	0.14	0.62	0.41	0.04	0.10	Med-high
F-Rose	0.02	0.02	0.05	0.04	4.34	4.63	0.22	0.20	Medium
G-Rose	0.03	0.03	0.05	0.05	0.30	0.25	0.12	0.22	Mixed
J-Rose	0.00	0.00	0.13	0.12	0.00	0.00	0.66	0.78	Mixed
K-Rose	0.05	0.05	0.15	0.15	1.43	1.66	0.00	0.11	Med-high
L-Rose	0.06	0.04	0.09	0.09	1.54	1.64	0.07	0.08	Medium
M-Rose	0.02	0.02	0.06	0.06	3.47	4.05	0.10	0.11	Medium
average	0.09	0.09	0.09	0.09	1.45	1.36	0.14	0.17	

Source: author's calculation based on data obtained from EHDA.

Regarding export share, firms have almost similar shares in both export value and volume, but for the sake of consistency, export value is used as an indicator. As Table 7 shows, in the period 2011 to 2015, the average export share of the 11 firms is nine percent while the maximum and minimum are 15 and four percent respectively. Most of the firms that have a larger share (from nine to 15 percent) have high or medium-high aggregate technological capability scores, but one firm has a low-medium score (B-Rose) and one firm has a mixed score (J-Rose). Most of these firms kept their position from the 2005-2010 period in having above the average export shares, but the share of B-Rose declined significantly from 35 to nine percent.²⁸ Whereas firms with an export share below the average demonstrate medium or mixed capability scores and compared to the first period (2005-2010), these firms showed growth in export share.

It is noteworthy that despite their similarity in age and size, the pace of growth is different across the local firms. In general, within the two periods, some firms increased their share slightly (e.g. C-Rose, F-Rose, and G-Rose), a few experienced a sharp increase or decrease (J-Rose, K-Rose, B-Rose), while others—especially firms that have larger market share in both

²⁸ This B-Rose's high share (35%) in 2005-2010 is largely due to the fact that most of the other firms has been just established while B-Rose was already exporting for over two years.

periods—showed a slight decrease in the second period (A-Rose, D-Rose, E-Rose). These trends indicate that firms go through their own learning path, each facing to a different degree, rapid growth, stagnant periods and setbacks. Thus, the link between firms’ technological capability and competitiveness gets more complex and dynamic as a firm goes through its learning process, with ups and downs along the path. Notwithstanding that, even from such static data, some relationships between capability scores of firms and their competitiveness can be traced.

The nexus between technological capabilities and competitiveness is further explored by looking at firms’ annual export value per worker, average export volume (number of stems) per hectare, price and profit/loss. The type of product can influence yield per hectare, but as the firms largely grow similar types of roses, the difference would not be that significant. In any case, we attempted to offset this limitation by measuring export value per worker as well. Regarding profit/loss, firms indicated only the number of times they made loss since starting operation and their experience in 2015.

Table 8: Performance of Ethiopian-owned Flower Firms

Firms	average export volume (in # of	cultivated land (ha	# of workers	average annual exported stem/ha	annual export value (2015)	export value per worker	price	profit/loss (2015)	capability score
A-Rose	14,465,650	26	550	556,371	1,865,251	3,391	Low	loss	High
B-Rose	14,170,380	27	710	524,829	2,066,526	2,911	Low-medium	loss	Low-med
C-Rose	15,182,777	16	400	948,924	2,208,481	5,521	Medium	profit	Medium
D-Rose	18,769,383	20	520	938,469	2,215,265	4,260	Low-medium	profit	Med-high
E-Rose	28,370,112	15	420	1,891,341	3,947,272	9,398	High	profit	Med-high
F-Rose	11,627,732	10	260	1,162,773	1,319,730	5,076	Medium-high	profit	Medium
G-Rose	7,814,060	18	300	434,114	1,143,896	3,813		profit	Mixed
J-Rose	43,939,168	38	955	1,156,294	5,039,542	5,277	Low	loss	Mixed
K-Rose	29,893,881	27	675	1,107,181	3,920,504	5,808	Medium	loss	Med-high
L-Rose	24,253,971	17.5	480	1,385,941	2,667,489	5,557	Medium	breakeven	Medium
M-Rose	12,890,087	12	400	1,074,174	1,740,157	4,350	Medium-high	loss	Medium
Average	20,125,200	21	515	1,016,401	2,557,647	5,033			

Source: Author’s calculation based on firm survey, interviews, and data collected from EHDA.

Note: For export value, export volume and number of workers, firms gave their estimate based on their 2015-2016 experience. However, compared to the data of EHDA, their estimate is a little bit overstated, especially for value. Due to that EHDA data of 2015 is applied in the calculation of export value and export volume but number of workers taken as given by firms which in turn might slightly over/under state value per worker. Price score is given based on the ranking of buyers and unpacking agents in the Dutch auction so data for G-Rose is missing since it does not sell in this end-market. Cultivated land per hectares is as of June 2016 excluding expansion progress. It was attempted but difficult to get reliable and complete data on revenue and cost breakdowns from all firms.

Again, the analysis not only shows some clear correlations between capability scores and competitiveness of firms but also reveals more complex relations. For instance, most of the local firms with an aggregate technological capability score of medium to high exhibited higher (above average) performance in export value per worker (average USD 5,033); whereas, a firm that scored low-medium shows below average performance. Nevertheless, there are firms that have a mismatch between the capability score and performance. For example, D-Rose and A-Rose achieved a higher capability score but below average export value per worker and export volume per hectares. Furthermore, the two firms that have mixed capability scores appear with opposite performance in competitiveness. While one (J-Rose) performs high (above average) in both indicators, the other firm (G-Rose) shows a performance far below average. In relation to profit/loss, all firms that declared profit or breakeven have capability scores of medium or above (except G-Rose, which has a mixed capability score). Nevertheless, there are firms with a variety of capability scores (from high to low-medium) that reported losses.

The dynamics and complexity of the relationship becomes more nuanced with the last indicator of competitiveness, which is price. Prominent end-market actors were interviewed, including buyers/e-traders and unpacking agents at the Dutch auction, to gather reliable data on price.²⁹ Both groups of respondents (buyers and unpacking agents) agree that consistency—in terms of quality, volume and availability (presence) at the auction/market—is the most important factor in obtaining a higher price as well as for obtaining better terms of contract in direct sales. The views of these end-market actors were very useful in understanding the rules of the game in the Dutch market vis-à-vis the capabilities and competitiveness of firms.

Looking at the current (2016) price performance of firms, E-Rose fetches the highest price of all the local firms, and this is consistent with other competitiveness indicators as well as the capability score of E-Rose. M-Rose and F-Rose are ranked second and third in price but their capability scores are at the lower end of medium. Moreover, M-Rose recorded below average performance in some of the other indicators of competitiveness. The price performance of A-Rose and J-Rose stood at the lowest end, while the rest (B-Rose, C-Rose, E-Rose, K-Rose, and L-Rose) at a medium level (that is between F-Rose and A-Rose or J-Rose), although some are closer to the higher end. In other words, for a rose of the same variety, E-Rose often earns 4-5 Euro cents more per stem than the rest of the local firms on average. However, M-Rose and F-

²⁹ Interviews were conducted during October and November 2016 at their respective offices in or near Flora-Holland auction houses. All local firms except E-Rose and G-Rose use the same unpacking agent but the interviewed unpackers and buyers are familiar with performance of E-Rose. However, there is not much information on G-Rose since it no longer sells in the Netherlands.

Rose are not far behind, earning 2-4 Euro cents more than the rest of the local firms and C-Rose³⁰, K-Rose and L-Rose earn 1-2 Euro cents more than the remaining firms.

Price performance is directly influenced by local firms' consistency, which is measured by the function of the three factors (quality, volume and availability of supplier in the specific market channel). Fluctuation (beyond a certain limit) in any one of the three factors negatively affects the price of the product in the Dutch auction as well as contracts in direct sales. In addition to that, trust-based communication³¹ (personal as well as virtual) plays a significant role in boosting the three factors and hence the price.

Requiring supplier firms to be consistent is not unique to the Dutch market, but it is rather common in both market channels and in several end-markets but the degree of importance might vary. Yet this does not minimize the fact that exporting to diversified end-markets can pose a serious challenge to consistency. This implies that developing higher technological capabilities can result in fetching a proportional price (competitiveness) only if it is played by the rule of the end-market/market channel. Hence it makes sense if firms decide to selectively develop the capabilities that enable them to meet the rules of their targeted end-market or market channel and thus obtain a higher price. Rules of individual buyers and end-market/market channels are not completely uniform, so if firms want to sell in different end-markets/channels, they might need to build or deepen several capabilities in order to consistently comply with all rules of different end-market/market channels without sacrificing one for another. This might include, but not be limited to, increasing the size of the farm, introducing new varieties, applying different production processes, marketing techniques and so on.

Firms go through choosing end-markets/channels and developing capabilities all the time but each has its own learning path to smoothen out capability vis-à-vis end-market(s) requirements while keeping its broader position in all end-markets. For instance, if a firm that sells via Dutch auction wants to expand to the Middle East, it needs to make sure that the new move would not affect its consistency (quality, volume, and availability) in the Dutch market, otherwise the steps the firm has taken in order to cater to the Middle East might affect its competitiveness (price) in the Dutch auction, at least temporarily. The more diversified the end-markets are, the more challenging this task would become.

As discussed above, E-Rose, F-Rose and M-Rose seem to choose to sell through a single market channel (Dutch auction), and they get a higher price than all the firms that sell in several end-

³⁰ Apart from consistency, this firm's price is influenced by its product type (larger head size) due to its higher altitude.

³¹ This communication includes exchanging information, handling inquiries and negotiations, personal visits, informal/formal meetings and so on.

markets/market channels regardless of their capability scores. The fact that these firms' focus on a single market channel might help them achieve higher consistency in all the three factors, alongside building a reputation, than the rest of the local firms. Therefore, in order to be competitive, firms may not necessarily need to build all capabilities, rather they might develop strategically selected ones that are needed for 'reaching a better deal' (profitability, minimized costs, stable income flow) in a given end-market/market channels or preferred export trajectories. In the face of highly competitive world markets and rising standards, the sustainability of such a strategy might be debatable. On the other hand, a strategy of relying on a single end-market or market channel entails high risk.

The export trajectories of Ethiopian-owned Flower Firms

End-markets specifications influence competitiveness in a way that can affect firms' decision to invest in learning and building different categories of technological capabilities. Therefore, the local firms are categorized into three export trajectories depending on their market channels and end-markets: trajectory 1, largely Dutch auction but diversified end-markets; trajectory 2, direct sales only; and trajectory 3, Dutch auction only. Table 9 presents the capability score and competitiveness measures of local firms grouped according to their export trajectories.

Table 9: Capability Score and Competitiveness Measures of Ethiopian-owned Flower Firms by Export Trajectory

Firms in trajectory:	certificate	Export share (% in 2015)	Export volume/ha	Export value/worker	price	profit	Capability score
Trajectory-1 (largely Dutch auction but diversified end-markets)							
A-Rose	FFP CoP-Silver	13	555,372	3,391	Low	Loss	High
B-Rose	MPS-ABC	8	524,829	2,911	Low-medium	Loss	Low-Medium
C-Rose	MPS-ABC, SQ	4	948,924	5,521	Medium	Profit	Medium
J-Rose	MPS-ABC	11	1,156,294	5,277	Low	Profit	Mixed
K-Rose	FFP, CoP-Gold	15	1,107,181	5,808	Medium	Loss	Medium-high
L-Rose	FFP, Fairtrade	9	1,385,941	5557	Medium	Breakeven	Medium
Trajectory-2 (direct sales only)							
D-Rose	MPS-ABC, SQ	9	938,469	4,260	Low-medium	Profit	Medium-high
G-Rose	CoP-Bronze	5	434,114	3,808	-	Profit	Mixed
Trajectory-3 (Dutch auction only)							
E-Rose	FFP	14	1,891,341	9,398	High	Profit	Medium-high
F-Rose	MPS-ABC, SQ	4	1,162,773	5,076	Medium-high	Profit	Medium
M-Rose	MPS-ABC	6	1,074,174	4,350	Medium-high	Loss	Medium

Trajectory 1: Largely auction but diversified end-markets

This trajectory includes local firms that largely sell via Dutch auction but try to diversify to all kinds of end-markets. It includes A-Rose, B-Rose, C-Rose, J-Rose, K-Rose and L-Rose. These firms have mixed performance in competitiveness and capabilities. Half of the firms (C-Rose, K-Rose and L-Rose) exhibit relatively stronger performance in both, while the other half have

mixed results. B-Rose is exceptional as it shows a lower performance in both capability score and competitiveness. Regarding profit/loss, some of the firms have made loss only once or twice since they started operation (A-Rose, K-Rose and L-Rose), while the others reported a loss for three or more times. Although firms in this trajectory are generally dependent on the Dutch auction, they show a stronger desire to diversify to other end-markets and market channels. As shown in Table 1, all of the firms in this group export to two or three regions, and for most of them, the Middle East is the second most important destination. Despite such a tendency to diversify end-markets, some of these firms do not seem to have a clear marketing strategy that is coherent with their marketing activities.

However, entering a new end-market essentially demands some deliberation on how it impacts the broader market position of a firm. Some preparations and adjustments are needed, which might mean deepening certain capabilities more than others or making strategic choices in developing selected capabilities that make more sense vis-à-vis firm's trajectory. This can be more complicated if the end-markets have distinct requirements that cannot be met with the same production process, such as with the Dutch auction and the Middle East. Thus, if a firm enters these two end-markets without proper planning and preparation, it might find it difficult to strengthen its position within either of these end-markets. Such a process largely involves learning-by-doing, which might cause loss-making until the right capabilities are developed or new routines are mastered. In turn, this process affects the nexus of firms' capabilities and competitiveness.

Trajectory 2: Direct sales only

This trajectory consists of firms that only sell via the direct sales channel: D-Rose and G-Rose. These two firms are similar in choosing direct sales as their market channel and in using personal networks to market and promote their products. Although both firms moved away from the Dutch auction to direct sales to Europe and the Middle East, D-Rose is still closely embedded in the network around the auction, while G-Rose is more connected to the Middle East market. Both firms show mixed performance in competitiveness, but G-Rose is mostly at the lower end in all aspects except in profit/loss. Even though both firms reported a profit in 2015, in the past G-Rose experienced more loss-making years than D-Rose which only made loss once. In terms of capability score, D-Rose scored medium-high, while G-Rose showed a mixed score. Furthermore, G-Rose is the only firm that does not adopt international certificates, because they are less relevance in the end-markets targeted by the firm such as the Middle East and Southern Europe (Spain, Greek, and Italy). Similarly, although D-Rose sells directly to Western Europe, it did not feel the need to take on consumer labels.

Trajectory 3: Dutch auction only

Firms in this trajectory sell via Dutch auction/auction-direct only: E-Rose, F-Rose and M-Rose. Like the firms in the above two trajectories, these firms also show variation in their capability scores (medium and medium-high) as well as in competitiveness. However, all three firms show a more consistent correlation between performance in capabilities and competitiveness. E-Rose scores higher in both capabilities and competitiveness. F-Rose shows medium performance in both capabilities and competitiveness, while M-Rose scores a bit lower in some competitiveness measures. E-Rose is the only firm that never made a loss, but the other two firms in this category reported making a loss at least once. The three firms seem to have similar marketing strategies but their progress varies. E-Rose appears to have a stronger position in the Dutch auction than the other two firms.

As mentioned earlier, almost all firms began exporting via the Dutch auction but over time they took different paths. The local firms' export trajectories in 2016 were the outcomes of learning-by-doing processes that can involve progress as well as setbacks; in turn, this can affect the correlation between capability and competitiveness measures.

Conclusion

This paper presented an overview of the Ethiopian floriculture industry, including its emergence and development in the context of the floriculture global value chain. It highlighted the role of local and foreign investment as well as government industrial policy and official development cooperation. Despite facing challenges arising from the global financial crisis, Ethiopia's floriculture export industry became the fifth largest in the world and the third largest supplier of the European market. The paper highlighted that the position of local firms, however significantly, declined over time, from 38 in 2007 to 15 in 2016.

A local firm survey was carried out with 13 of the 16 local firms in June 2016 to assess their technological capabilities. The joint venture firm was excluded from the survey after initial research showed that the local investor was not an active partner. It was not possible to include the remaining two firms in the survey, both of which are connected to the business empire of Mohammed Hussein Ali Al-'Amoudi. Of the 13 surveyed firms, 11 of them were actively operating while two were struggling for their survival. The ownership of local firms included indigenous business families, diaspora investors and party-owned firms, as well as firms linked to Al-Amoudi's business empire. None of the local firms had prior experience in the floriculture industry before investing. They hired foreign expertise as consultants and managers, who played a significant role in setting up the business, training workers and advising in important decisions

such as selecting varieties and market channels. The role of foreign expertise has changed over time, as the firms engaged in learning by doing. Foreign experts largely have been replaced by locals, workers have been trained by internal experts, and firms have been taking the lead in selecting varieties as well as markets. Along the way, each firm has built its technological capabilities in an idiosyncratic way.

The local firm survey measured the capabilities of each firm in terms of the core functions required to enter and operate in the floriculture global value chain but allowing for variation in market channels and end-market diversification. The results of the firm survey were analyzed in terms of four categories of capabilities—product and production process, input integration, linkages and end-market—and several indicators were created for each category based on questions from the survey. The aggregate technological capability scores show that all firms have developed their capabilities, as they scored medium and above in most categories. However, none of the firms, except one, showed a uniform score across the four capability categories, which means that firms did not build all categories of capabilities to the same level. This was even the case for firms with relatively similar age and size.

The paper compared the firms' aggregate capability score with some indicators of competitiveness, including export share, export volume per hectare, export value per worker, profitability and price. The findings point to a complex relationship between firms' capabilities and competitiveness. Although there are some firms that had a clear correlation between the two, other firms appeared with mismatching results: for example, exhibiting higher capability scores but lower performance in competitiveness measures. Evidence such as firms' export trends and export volumes highlight dynamics within the firms, as they experienced rapid growth as well as periods of stagnation and setbacks.

The complexity of the relationship between capabilities and competitiveness, as well as the potential influence on firms' investment in learning, was further nuanced by examining price. Firms that specialized in the Dutch auction market channel and developed the specific capabilities required to perform well in this market—consistency in quality, quantity and presence at the auction—obtained higher unit prices in the auction than local firms which operated in multiple market channels, and thus had trouble achieving as high a level of consistency in the Dutch auction. This finding indicates that firms can increase their competitiveness (measured in term of unit price) by selectively deepening capabilities that are important to meeting the requirements of the targeted market channel.

The different export trajectories among firms can explain some of the discrepancies between capabilities and competitiveness. Three trajectories were identified: firms that largely sell via

Dutch auction but try to diversify to all kinds of end-markets (trajectory 1); firms that sell via direct sales only (trajectory 2); and firms that sell via Dutch auction only (trajectory 3). Firms in trajectory 1 face the challenge of meeting different specifications of several end-markets in a consistent manner, and the process might sometimes cause mismatches in their capabilities and competitiveness as it can involve financing losses until new routines are mastered and/or one or more capabilities are deepened in a way to strengthen the firms' position in end-market(s). However, some of the firms in this trajectory seem to lack a clear marketing strategy that is coherently linked with marketing activities. To some extent firms in trajectory 2 face similar challenges as they sell to different buyers. But since they often sell in fixed contracts and use personal networks in marketing, they are in a better position to deal with different specifications. Nevertheless, the firms in this trajectory also have mismatches in their capability score and competitiveness. Amongst other things, this might be due to the considerable differences in their personal networks and associated end-markets, where one sets higher business standards than the other. In Trajectory 3, despite differences between each other, the firms appear to be more consistent among, scoring relatively similar results in both capability and competitiveness.

To deepen our understanding of such complexity, more information is needed about these firms. The next phase of the research focuses on further understanding the factors that explain firms' choices, their aggregate level of capabilities, as well as the particular export trajectory they are following and how it may influence which capabilities get built. In doing so, the research will examine the impacts of firm-specific characteristics, the national institutional context and global value chain dynamics on firms' investments in learning, capability building and competitiveness outcomes, and also the mechanisms through which learning takes places. For this purpose, we have selected a sample of local firms with which to conduct firm histories—a qualitative method based on repeated interviews with firm owners, management staff, workers at the firm sites, combined with extensive interviews with relevant government officials, sector institutions, industry actors, experts and foreign firms in relation to their influence on the selected firms' processes of learning and building capabilities. The sample includes firms from each of the three trajectories, and they were strategically selected to capture variation in export performance and type of local ownership. Accordingly, the following firms have been selected for the firm histories: A-Rose, B-Rose, E-Rose, G-Rose, H-Rose, I-Rose, J-Rose, and K-Rose.

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Annex 1

Floriculture Sector Local Firm Survey Questionnaire Ethiopia 2016 (administered by the researcher)

PART I: FIRM PROFILE

Name of firm	
Address (cluster name)	
Website	
Name of interviewee Job title Duration of employment	
Ownership structure/nationality	a) Indigenous b) Indigenous-diaspora (lived outside the country for an extended period of time) c) Diaspora (may not have citizenship, but lives their permanently) d) Joint venture (specify equity distribution and management control)
Date of establishment Date of production/export	
Total size of land holding(ha) Cultivated land size (ha)	
<i>Number of employees</i>	
Product type today (%)	a) Rose b) Summer flower c) Bouquet flowers d) horticulture
Name main product: # of varieties of main product(s).	
Export destinations (%)	a) Europe -auction -direct b) Middle east c) Other
# of export days per week to/via	d) Europe -auction -direct e) Middle east

	Other
<i>Average annual export (volume) In USD/Euros</i>	
Certificates:	a) Bronze: c) MPS: c) other (specify)

PART II: INVESTMENT

Was a feasibility study carried out before the initial investment?	a) No b) Yes By whom?
Had the owner/GM experience in the sector or in business?	a) No b) Yes Explain:
How did the firm get managerial expertise and skilled labour in the beginning?	a) Buy it from abroad (foreigners). From where? b) Employ nationals with previous work experience in flower farms. From which firms? c) Trained workers and/or managers
How was location selected?	a) Allocated by govt b) Based on feasibility study/market research c) Other
How were varieties selected? Now?	a) Just following g what other firms do (neighbors) b) Amount of royalty fee c) Based on product life cycle analysis d) Experimenting what is best on the location e) Producing what buyers demand/ based on market research f) Other
With how many varieties of roses the firm started exporting?	
How was the investment finance raised? How was working capital raised?	a) DBE (govt bank) b) Locally owned private bank c) Sister company d) Joint venture-PSOM or other subsidies e) other
How did the firm get its first buyer? <i>auction:</i> How did the firm access auction? <i>Direct sale:</i> How did the firm	

access/establish contact to buyers in : - Europe? -middle east? -Other?	
Equipment	
What are the main features of your greenhouse?	a) mechanical ventilation system b) flexible window opening c) fixed window opening d) Climate registration and sensors
Why you select the specific type of greenhouse?	
Have you changed your greenhouse since first time? If yes, when and why?	
How does the fertigation system work in the greenhouse?	a) Fertigation at fixed time interval and no automatic adjustment b) computerized fertigation automatically adjusted based on climate data (radiation) c) computerized and automatically regulate fertigation (amount and proportion) with additional sensors

PART III: END MARKET

Do you know your main buyers in auction? If Yes, How many are they?	
Do you have direct contact with the auction buyers?	
If YES, How did you establish that?	a) Via FloraHolland direct b) Other
How stable are your relationships with your auction main buyers? If a) ask # of years and with how many buyers	a) Stable b) Somewhat stable a) Ad hoc
In direct sale, who are main buyers? How many in: -Europe? -Middle east? -Japan? -others?	

How stable are your relationships with your main buyers? If a) ask # of years and with how many buyers?	a) Stable b) Somewhat stable c) Ad hoc
What are main difference in buyers' requirements of different end-markets?	
Does the firm has contract with direct buyers? If yes, give general features: Duration, price, quantity and quality	
How does price determined in direct sale to: -Europe? -middle east -Japan -Other	a. Fixed- cost-price plus b. Negotiation based on auction c. Other (specify)
Which end market offer best price?	a) Europe b) Middle east c) Japan d) other
Which market channel offer best price?	a) Auction b) Direct sale
Why did you diversify end market?	
Has the firm engaged in market intelligence and market & buyer research? How? list	

PART IV: PRODUCT and PRODUCTION PROCESS

<i>Describe the main products & portfolio? (%)</i>	a) Sweethearts-small b) Intermediate c) Large flower d) other
Average annual internal reject rate? Market place reject rate	

Average unit price of products?	
What is your most frequent product grading score for Dutch Auction?	a) A b) A1 c) B
What measures the firm took to improve quality?	
At what stages do you monitor quality in GH and PH?	
From where or from whom do you get advice to improve product quality?	a) Auction b) Local firms (in a formal/informal settings) c) Foreign firms (in a formal/informal settings) d) Hired consultants e) breeders f) EHPEA (growers' association) g) EHDA (government agency) h) Other (specify)
Do you promote your products? How? list	If yes, How? a. Via website b. Participating in trade fairs (local and international) c. Printing logo on packages d. CSR e. Other (specify)
What do you do to prevent and cure diseases?	a) Chemical spray, b) Integrated pest management (IPM) c) Both (a and b) d) Other (specify)
How is supervision of workers organized in GH and PH?	
How do you deal with production during seasonal market fluctuations (low/high seasons)?	a) Destroy b) Fill the gap or share surplus from/with neighbour/friend farm c) Other__
How do you deal with labour during seasonal fluctuation?	a) Hire casual labour b) Engaging them in other work internally c) Sending them temporarily to other firms d) Lay off e) other
Do you record data? On what issues?	

EFFICIENCY & PRODUCTIVITY	
<i>Firm's profit % before tax 2015?</i> <i>Did the firm incurred loss since establishment? how many times ?)</i>	
<i># of workers per hectare</i>	
<i>Unit cost (ETB and/or USD):</i> <i>Production cost:</i> <i>Transport:</i> <i>Marketing:</i>	
LABOUR MANAGEMENT	
Share of expatriate workers? In which positions? Development (10 years)?	
Have locals increased their share in management, technical jobs, supervisors?	a) No b) Yes
Which group of workers do you often hire from other farms?	a) General workers b) Supervisors and other staff c) Managers, d) Other
Labour turnover? Absenteeism? Unrest downtime?	Average per year: Average per year: Average per year: Is there a seasonality component?
Does the firm have a labour retention strategy?	a) No b) Yes What is it?
Is training offered to workers? If Yes, Type of training, by whom?	a) Internally b) Externally
Is the firm has HR policy?	a) No b) Yes

PART V: SUPPLY CHAIN LINKAGES

Where does firm get information from on	a) Local firms b) Foreign firms
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markets, buyers, products, technology, production, etc.?	c) Buyers d) Hired consultants e) Industry association f) Relevant ministry/public institution g) Other:
Is the firm a member of an industry association?	a) No b) Yes Which? How often does it meet? Main benefits for your firm?
Does the firm participate in collaborative schemes or informally with other firms? Horizontal/competitors or vertical/suppliers? If so, what kind of schemes (training, input sourcing, etc.)?	a) Limited links with other firms b) Medium links c) Close networks Local firm Foreign firm
How often does the firm seek knowledge or advice from other firms on how to improve production and marketing?	a) Not very often b) Sometimes c) Very often Which firms?
COOL-CHAIN	
Do the firm own cold truck? If no, where do you get the service?	a) Yes b) No
Do the firm have challenges related to cool-chain management? If yes, describe.	
Are there challenges related to cargo booking and handling services? If yes, explain	a) Yes No
What is your relation with the handling agent/distribution	a) Buying the service b) Joint venture c) Other (specify

centre at end market?	
Do buyers have responsibility in relation to logistics? If yes, what?	a) Yes b) No
INPUTS	
How is your relationship with breeders? Explain	a) Not good, unable to get certain varieties b) Discriminations in accessing certain varieties c) Good, able to access varieties as wanted d) other
Do you propagate plants at your farm? If yes, why?	
How do you source inputs?	a) buy it from local importer/supplier % chemical: fertilizer: packaging: b) Import it internally% chemical: fertilizer: packaging: c) other
What are the main challenges in managing input sourcing?	

PART VI: FINANCE & SUPPORT

Does the firm have relationships with external public & private institutions?	a) Limited links with institutions b) Medium links c) Close networks
Which are most important institutions?	
Does the government (Ministry of Industry, industry-specific agencies) provide support services to the sector?	a) No b) Yes What kind of support services?
Does your firm participate in those services?	a) No b) Yes Which?

	Are they useful?
Does the firm have access to sufficient investment and working capital?	a) Yes How? b) No Why not?
Does the firm interact with any education or research institute?	a) No b) Yes Which ones? How?
Does the firm buy management, technical or administrative/IT consulting services?	a) No b) Yes Which areas? From whom? a) Foreign firms b) Domestic firms

PART VII: PRODUCT DIVERSIFICATION

Where and how do you sell the new products?	
What changes did you make to deal with new products?	a) Investment b) Production c) Supply chains and linkages
What are advantages & challenges of working in different products and market?	

The Center of African Economies is an interdisciplinary research center within the Department of Social Sciences and Business at Roskilde University. Scholars associated with the Center research and publish on contemporary economic dynamics in Africa with a particular focus on:

- the nature, pace and outcomes of capitalist transformation processes unfolding across the African continent;
- who benefits and how those benefits are shared as well as how the distribution of economic benefits is contested and the implications for political instability; and
- linkages between the regulation of economic transactions and state formation in African countries.



Center of African Economies

Roskilde University
Universitetsvej 1, Postbox 260
4000 Roskilde, Denmark

